



Democratic Arab Center

# Journal of Afro-Asian Studies

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**Allocution du rédacteur en chef de la revue**

**Dr. Ali Latreche** /Maître de conférences "A" (Algerie)

*Le chercheur dans le domaine du droit, quelle que soit sa position juridique, se rend compte que la loi, avant d'être des règles coercitives, est une régulation de la réalité, ce qui signifie qu'elle est une projection d'une philosophie réaliste. C'est pourquoi l'autorité législative utilise diverses études et de nombreuses approches scientifiques avant d'approuver diverses législations. Car la loi a deux faces, dont l'une est cachée, représentée par l'esprit, et une autre forme apparente représentée par le texte formel et rigide, et puisque cette image est parfois cachée à l'exécutif et les autorités judiciaires, l'application de la loi est abandonnée dans une conception superficielle et naïve en approuvant l'aspect formel rigide et en négligeant l'aspect spirituel.*

*Tout comme l'homme a un corps et une âme, Dieu Tout-Puissant s'est adressé aux gens à travers eux, tout comme les actions, les paroles et les décisions du Prophète et de ses compagnons. Mais avec le temps, on se rend compte de la véritable profondeur de ce discours. On se rend compte que la morale vertueuse était le but recherché, et qu'on ne peut l'affiner sans s'adresser à l'esprit.*

*Même si la réalité pratique est de projeter l'esprit de la loi sur les textes législatifs, le débat reste en termes de capacité et d'aptitude à comprendre ce concept dans sa formulation et son application. Une autre réalité a prévalu, dans laquelle les intérêts étroits et privés des gens exploitent cette réalité en exécutant l'esprit de la loi ou en l'utilisant pour servir leurs intérêts sous prétexte de pouvoir discrétionnaire.*

## **Speech by the Editor-in-Chief of the Journal**

**Dr. Ali Latreche / Lecturer “A” (Algeria)**

*The researcher in the field of law, whatever his legal position, realizes that the law, before being coercive rules, is a regulation of reality, which means that it is a projection of a realistic philosophy. This is why the legislative authority uses various studies and numerous scientific approaches before approving various legislations. Because the law has two faces, one of which is hidden, represented by the spirit, and another apparent form represented by the formal and rigid text, and since this image is sometimes hidden from the executive and judicial authorities, the application of the law is abandoned in a superficial and naive conception by approving the rigid formal aspect and neglecting the spiritual aspect.*

*Just as man has a body and a soul, God Almighty spoke to people through them, as did the actions, words and decisions of the Prophet and his companions. But with time, we realize the true depth of this speech. We realize that virtuous morality was the desired goal, and that we cannot refine it without addressing the spirit.*

*Even if the practical reality is to project the spirit of the law onto the legislative texts, the debate remains in terms of the capacity and aptitude to understand this concept in its formulation and application. Another reality has prevailed, in which people's narrow and private interests exploit this reality by carrying out the spirit of the law or using it to serve their interests under the guise of discretionary power.*

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# ***Constitutional Guarantees for Information and Communication Technology and the Adaptation of the Constitutional Court and the Judiciary to It***

***Dr. Asma Bouraoui<sup>1</sup>***

*Doctorate in Constitutional Law*

*Algeria*

## ***Abstract:***

*The paramount authorities in the nation are deeply committed to expediting digital transformation by widespread adoption of information and communication technologies across administrative and public service sectors, coupled with enhancing the management of the economic domain. This initiative aims to alleviate the barriers faced by citizens in accessing digital public services. The Constitutional Court and the Algerian judiciary system, paralleling all sectors of economic and social development, have embraced digitalization to eradicate the delays in justice delivery and to strive for the realization of prompt and efficient justice, serving the citizens in alignment with the twenty-fifth (25) commitment of President Abdelmadjid Tebboune. This discourse will explore the constitutional safeguards for information and communication technology and the adaptation mechanisms of the Constitutional Court and judiciary to these advancements.*

***Keywords:*** *Constitutional guarantees; Information and Communication Technology; Constitutional Court; Justice sector.*

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<sup>1</sup> Email: [bouraouiasma2021@gmail.com](mailto:bouraouiasma2021@gmail.com)



## **Introduction:**

*The significance of digital transformation within state institutions has been underscored by the global technological evolution, compelling nations to prioritize the enhancement of their technological infrastructure. This transformation necessitates the adoption of administrative methodologies that are oriented towards citizen satisfaction, thereby steering towards the digitization of government operations, commonly referred to as digital transformation in the public sector.<sup>2</sup>*

*In Algeria, the momentum for digital transformation has significantly increased with the introduction of several digital initiatives, such as the government services portal and the investor platform. These initiatives aim to bridge the gap between the administration and citizens, ensuring the provision of high-quality services.<sup>3</sup>*

*This initiative is a manifestation of President Abdelmadjid Tebboune's twenty-fifth (25) commitment towards accelerating digital transformation through the widespread use of information and communication technologies, particularly in administrative and public services, and enhancing economic sector management.*

*The Algerian Constitutional Court stands as a constitutional entity endorsing this digital shift by modernizing its internal electronic operating system to transition into a digital Constitutional Court. The judiciary sector has also undergone modernization, witnessing the emergence of electronic litigation, particularly post the COVID-19 pandemic outbreak.*

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<sup>2</sup> *Government Digitization, Etunum, accessed on November 19, 2023.*

<sup>3</sup> *"2022... The Year of Accelerating Digitization in Algeria," Echorouk Online, accessed on November 19, 2023.*

The Ministry of Justice and courts have introduced electronic systems designed to streamline various judicial processes and enable remote transactions. The essence of electronic litigation is captured in the ease of remote case file access, the facility for remote memo exchanges, and the capability to submit applications without unnecessary delays. This approach not only eliminates repetitive tasks, such as visiting multiple locations for lawsuit filing and registration and paying fees via electronic payment modes but also simplifies procedural notifications.

It enhances mobility, conserves time, and obviates the need for physical court visits to check decisions or verdicts, as well as the necessity for travel to attend court sessions. The possibility of instantly transmitting case files from first-instance courts to appellate courts and the straightforward remote access to case files are additional benefits. Furthermore, this system introduces several positive outcomes, including reducing court congestion, safeguarding witnesses, experts, and crime victims, and expediting the litigation process, thereby saving time, effort, and costs while eliminating reliance on paper-based systems.

### **Problem Statement:**

What are the constitutional guarantees regarding information and communication technology, and how have the Constitutional Court and the justice sector adapted to this digital transformation?

We will attempt to answer this through the following plan:

- **First Axis:** The constitutional guarantees for information and communication technology and the adaptation of the Constitutional Court to it.
- **Second Axis:** The experience of the justice sector regarding electronic litigation.



## ***First Axis: The Constitutional Guarantees for Information and Communication Technology and the Adaptation of the Constitutional Court to It***

*The constitutional amendment of 2020, approved by the Algerian people through a referendum, fulfilled the promise made by the President of the Republic to his people when he pledged and committed to achieving 54 pledges, with the constitutional amendment being the foremost.*

*The constitutional amendment enshrined information and communication technology across several of its articles, including:<sup>4</sup>*

- *The guarantee of electronic press freedom.*
- *The right to establish websites and electronic newspapers.*
- *The activity of websites and electronic newspapers can only be suspended by a judicial decision (Article 54 of the Constitution).*
- *Every citizen's right to access information, documents, statistics, and to obtain and exchange them (Article 55 of the Constitution).*
- *The protection of individuals in the processing of personal data as a fundamental right, with the law penalizing any violation of these rights.*

*These provisions fulfill the commitments of the President of the Republic, including: establishing democracy, protecting the rights and freedoms of citizens, in addition to his commitment to a comprehensive reform of the state in all its branches and institutions of the republic, allowing the constitution to enshrine a rule of law state in service of the citizen and a modern, efficient, and legitimate state through its performance.*

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<sup>4</sup> *The 2020 Constitutional Amendment, Official Gazette, Issue No. 82, dated December 30, 2020.*



The Constitutional Court, established in the 2020 constitutional amendment, replacing the Constitutional Council, is considered the most significant constitutional guarantee for protecting the rights and freedoms stipulated in the constitution to enshrine the rule of law, as well as playing a role in serving citizens through information technologies. Undoubtedly, it is committed to keeping pace with the modernization of the Algerian state, akin to other state institutions.

It works on developing and updating its internal electronic work system to achieve a digital Constitutional Court.

For example:

The Constitutional Court promotes constitutional culture through:

- Its website, which serves as a means of communication and interaction, where it publishes its activities, national and international events related to its missions. For instance, regarding external activities, when participating in events and activities organized by international and regional bodies and organizations, either in person or via video conferencing technology. Publishing constitutional jurisprudence and the Constitutional Court's journal, decisions, and opinions issued in the performance of its duties, and issuing statements related to its activities and competencies. It also has official pages on social media platforms.<sup>5</sup>

Within the internal organization of the Constitutional Court's structures and apparatuses:

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<sup>5</sup> See Articles 37 to 40 of the Internal Regulations of the Constitutional Court, Official Gazette, Issue No. 75, dated November 13, 2022.

- There is a Directorate for Information Systems and Communication Technologies<sup>6</sup>, among its competencies are:
- Modernizing and digitizing the Constitutional Court's management system.
- Ensuring electronic vigilance.
- Developing networks, applications, and information systems.
- Managing and developing communication technologies in the Constitutional Court.
- Maintaining computer systems and communication devices.<sup>7</sup>

It's worth mentioning that the Constitutional Court's IT specialists have developed a special application for elections, which was used in the latest legislative elections in 2021 and the mid-term elections for the members of the Council of the Nation in 2022.

Among the benefits of the application are:

- Maintaining the confidentiality of information and databases, which are preserved within our entity.
- Eliminating manual errors, if any.
- Speed and accuracy in obtaining results.
- Ensuring transparency in the results.

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<sup>6</sup> Article 2 of the decision dated April 11, 2022, defining the internal organization of the Constitutional Court's structures and devices, Official Gazette, Issue No. 25, dated April 12, 2022.

<sup>7</sup> Article 10 of the decision defining the internal organization of the Constitutional Court's structures and devices, same reference.

Regarding the plea of unconstitutionality, notifications, observations, and documents are communicated through all means of communication. Notification via email is considered a valid notification. Sessions of the plea of unconstitutionality may have media coverage.<sup>8</sup>

In the field of legal consultation through referendum, the challenge is communicated by all legal means to the provincial electoral committee or to the electoral committee for residents abroad whose results are contested, to submit written memoranda.<sup>9</sup>

Article 2 of the decision dated April 11, 2022, defining the internal organization of the Constitutional Court's structures and devices, Official Gazette, Issue No. 25, dated April 12, 2022.

## ***Second Axis: The Experience of the Justice Sector Regarding Electronic Litigation***

### ***First: Definition of Electronic Litigation***

Electronic litigation specifically refers to the use of information and communication technologies to facilitate access to justice and communication among various actors in the field of law and judiciary (lawyers, judges, clerks, litigants), enhancing the efficiency of the judicial system, reducing costs, shortening the duration of legal disputes, simplifying legal procedures, increasing court productivity, and reducing opportunities for corruption and bribery.

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<sup>8</sup> Articles 20 and 34 of the Regulations defining the rules of the Constitutional Court, Official Gazette, Issue No. 04, dated January 22, 2023.

<sup>9</sup> Article 85 of the Regulations defining the operational rules of the Constitutional Court, same reference.



*The virtual court holding its sessions via video brings justice closer to citizens, especially those living in remote areas, and overcomes difficulties related to territorial jurisdiction.*

*In the realm of digital justice, litigants are exempted from traveling to courts, and this system also reduces the phenomenon of overcrowding.<sup>10</sup>*

*It is also defined as the process of electronically transferring litigation documents to the court via email, where these documents are examined by the competent official, who decides on their acceptance or rejection and sends a notification to the litigant informing them of the status of these documents.*

*According to this definition, a litigant or lawyer wishing to file a lawsuit electronically will send the lawsuit document via email through a website dedicated to this purpose, available twenty-four hours a day, seven days a week.*

*These documents are received by the company managing this website, then sent to the competent court, where the competent clerk examines the documents, decides on their acceptance or rejection, and sends an email to the litigant informing them of the receipt of their documents and the decision made regarding them.*

*Digital judicial systems also allow for the electronic filing of documents and petitions without the need for parties to travel, and lawsuit expenses can be paid using electronic payment methods, with the system potentially linked to other ministerial systems.<sup>11</sup>*

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<sup>10</sup> "Digital Justice from Theory to Application," *juris.ma*, date: March 11, 2021, time: 9:30.

<sup>11</sup> Khaled Mamdouh Ibrahim, *Electronic Litigation (Electronic Lawsuit and Its Procedures Before Courts)*, First Edition, Dar Al-Fikr Al-Jamie, Alexandria, 2008, pp. 16, 20.

## **Second: Technical Procedures for Filing a Lawsuit Electronically**

*Delving into the steps of electronic litigation necessitates clarifying the nature of the standard and the system for sending and accepting electronic litigation documents. It also requires identifying the devices a litigant needs to file a lawsuit electronically and outlining the necessary steps to undertake for electronic filing.*

### **A- Standard Used in Sending Electronic Litigation Documents**

*Filing a lawsuit electronically is facilitated through the internet using a system for sending and accepting electronic documents. This system is a specialized electronic system that opens communication channels between litigants and the court through an electronic window. Here, case documents are accepted electronically, judicial fees are paid, and acceptance is processed by the court clerk via the electronic window.*

*The electronic window on the court's website essentially performs the same functions as in the traditional litigation system, with the difference that information stored on paper is now stored on electronic media, and electronic authentication systems replace traditional methods for document verification.*

*In electronic litigation, data exchange is conducted electronically using XML in legal specifications to establish an e-filing system, thus standardizing case management systems across different courts.<sup>12</sup>*

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<sup>12</sup> Khaled Mamdouh Ibrahim, same reference, p. 31.



## ***B- Devices Needed by the Litigant for Electronic Filing***

*For a litigant to file a lawsuit electronically, it is essential that they have a computer connected to the internet. This computer must be equipped with a web browser, such as Netscape or Explorer, and software for reading documents like Adobe Reader. Additionally, software for viewing scanned images, such as a TIF reader, is necessary, along with a scanning device (scanner).*

## ***C- Steps Required for Electronic Filing***

*Addressing the steps of electronic litigation requires an elucidation of the standards and system for sending and accepting electronic litigation documents. It also necessitates identifying the devices needed by litigants to file a lawsuit electronically and delineating the requisite steps for electronic submission.*

*For litigants to proceed with filing a lawsuit electronically, it is imperative to have access to a computer connected to the internet. This computer should be equipped with a web browser, such as Netscape or Explorer, and document reading software like Adobe Reader. Additionally, software for viewing scanned images, like a TIF viewer, and a scanning device (scanner) are required.*

*Utilizing web pages enables litigants and lawyers to access all necessary lawsuit formats by filling out the information on the web page and then attaching additional files that need to be included with the lawsuit document. These documents and attachments are placed in an electronic data registry specifically designed for the electronic litigation system, which can be modified to meet court requirements.*

*With just a click of the mouse, the lawsuit document is directly sent to the court's registry through a secured and encrypted channel. Once the lawsuit is accepted, it is electronically documented and then forwarded to the designated official for automated processing.*



*The expenses associated with the lawsuit are predetermined through a pre-programmed system within the system and are paid directly to the court upon document submission. Litigation fees are paid using one of the electronic payment methods or via bank credit cards.*

*Upon the lawsuit document and accompanying documents reaching the competent court, the designated official reviews the document and decides whether to accept or reject it. In both cases, an email is sent to the litigant or lawyer informing them of the acceptance. In case of rejection, the official specifies the reason and the correct procedure to follow for document resubmission. Reasons for rejection could include non-payment or partial payment of judicial fees, lack of a lawyer's electronic signature on the document, or the document containing information contrary to public order and morals.*

*Once litigation documents are sent electronically, they are transferred to both the court's server and the server of the company managing the document transfer process. The court's registry office endorses these documents on the same day and time they enter the court's information system, from which legal deadlines are calculated.<sup>13</sup>*

*This process also requires technical means of encryption aimed at protecting the confidentiality of information and data by using specific codes known as keys. Data encryption aims to ensure its integrity, secure its privacy, and restrict its use to the intended recipient. Additionally, the use of passwords and information security systems is essential to protect litigants' data, rights, and secrets.*

*Digital justice is characterized by what is known as an electronic archive, facilitating the replication process in various forms, quickly and at lower costs. It can be transferred automatically from one location to another thanks to the*

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<sup>13</sup> "How to File an Electronic Lawsuit Electronic Lawsuit Form 2020," mhtwyat.com, date: March 10, 2021, time: 14:00.

internet. Court file storage becomes a national electronic information bank, preserving the archive in the long term, occupying minimal physical space, and serving as an alternative to large storage facilities that require human resources and additional investments.<sup>14</sup>

### **Thirdly: Implementing Electronic Litigation in the Algerian Judicial System**

Algeria adopted the e-government project and the reform and modernization of justice under Law No. 15-03, dated 11 Rabie Al-Thani 1436 corresponding to February 1, 2015. This law pertains to the modernization of justice and established the use of video conferencing technology in judicial procedures generally, without detailing the practical application methods.

Subsequently, President Abdelmadjid Tebboune was elected in 2019, one of his commitments being a comprehensive reform of the judiciary to ensure its independence and modernization through the digitization of electronic justice. This reform aimed at revising the operational and management methods of judicial bodies and ensuring fair treatment for all in justice.

This commitment was enshrined in Article 165 of the 2020 constitutional amendment, stating "The judiciary is accessible to all..." and Article 177 of the Constitution, stating "Every litigant has the right to claim their rights before the judicial authorities...".

Hence, recourse to justice is a constitutionally recognized right for every natural or legal person without discrimination based on gender, religion, or ethnicity. Equality means all citizens of the state exercise the right to litigation equally and under unified litigation procedures for everyone, in addition to the uniformity of the applicable law and equal treatment for all as stipulated by

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<sup>14</sup> [www.kapitalis.com](http://www.kapitalis.com), accessed on: March 10, 2021, time: 14:30.



Article 165 of the Constitution, which is based on the principles of legality and equality.

It is noteworthy that during and after the COVID-19 crisis, Algeria preserved these constitutional principles through the modernization of the justice sector. Significant strides were made in utilizing information and communication technologies and transitioning towards the digital world. Numerous projects were implemented to achieve a modern judiciary that meets international standards, especially in facilitating access to justice for all segments of society.

Decree No. 20-04, dated 11 Muharram 1442 corresponding to August 30, 2020, amending and supplementing Decree No. 66-155 dated 18 Safar 1386 corresponding to June 8, 1966, which includes the Code of Criminal Procedure, was issued.<sup>15</sup>

This decree devoted a new section titled **"The Use of Audio and Visual Communication Means During Procedures,"** divided into three chapters: General Provisions, The Use of Video Conferencing in the Judicial Investigation Phase, and The Use of Video Conferencing in the Trial Phase, thereby detailing the conditions and regulations for conducting trials remotely with precision.

This order allows judicial bodies, whether investigating or ruling authorities, to use this technology, which involves direct linking between the judicial authority and the penal institution where the accused is detained. This process is facilitated through advanced devices, including digital cameras transmitting high-quality images via a sophisticated and secure information network owned by the Ministry of Justice, with conversations recorded on an electronic medium to be later included in the judicial file.

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<sup>15</sup> Order No. 20-04 dated August 30, 2020, amends and supplements Order No. 66-155 dated June 8, 1966, which includes the Code of Criminal Procedure, Official Gazette, Issue No. 51, dated August 31, 2020.



To this end, courtrooms are equipped with high-definition televisions and cameras, similar to the equipment provided in special rooms within penal institutions. Communication and responses are conducted over the internet, with a qualified technical team recording all statements on an electronic medium to ensure their security and confidentiality.

### **1. The Use of Video Conferencing in the Judicial Investigation Phase:**

This is covered from Article 441 bis 2 to Article 441 bis 6 of Decree No. 20/04 mentioned above. Investigative authorities can use video conferencing for interrogating or hearing a person, conducting confrontations between individuals, and for notifications requiring the drafting of reports as stipulated by the Code of Criminal Procedure.

Investigative authorities include the investigating judge, the indictment chamber, and the sentencing authority when applying the provisions of Article 356 of this law (related to conducting a supplementary investigation).

If the person to be heard, interrogated, notified, or confronted is residing within the jurisdiction of another court, the competent investigative authority requests the public prosecutor of the court nearest to the person's residence to summon them for the procedure on the specified date.

If the person is detained or accused and cannot be extracted or transferred for the sake of justice, security, public health, during natural disasters, or to respect the principle of reasonable delays, the investigative authority, after notifying the director of the penal institution, may hear them using video conferencing in the presence of the institution's clerk of court.

The defense is entitled to be present with their client at the place of hearing and/or before the competent investigative authority. The penal institution's clerk of court prepares a report on the use of this technology, signs it, and then sends it to the competent judicial authority to be attached to the procedure file. The

person heard remotely signs a copy of the report sent to them by any means of communication, immediately after it is signed by the judge and the clerk of court at the competent judicial authority. If they refuse to sign or are unable to, this is noted on the report copy.

The mentioned copy is returned, using the same means of transmission, to the competent judicial authority to be attached to the procedure file, in accordance with Article 108. If the investigating judge orders the temporary detention of the accused heard via video conferencing technology, they notify them of this order verbally, informing them of their rights as stipulated in Article 123 bis of this law, and note this in the hearing report. A copy of this detention order is sent for execution via one of the means of communication, as appropriate, to the public prosecutor or the director of the penal institution.

## **2. Utilizing Video Conferencing in the Trial Phase:**

Article 441 bis 7 to 441 bis 10 of Order No. 20/04 aforementioned enables judicial authorities to independently resort to video conferencing or upon request by the public prosecution, any of the parties, or their legal representatives, for interrogations, hearings, or to conduct confrontations between individuals.

When the judicial authority decides on its own to use video conferencing, it consults the public prosecution and notifies the other parties involved. Should there be an objection from the public prosecution or if any of the parties or their defense or the detained accused or their defense present arguments justifying their refusal to comply with this procedure, and the judicial authority deems these objections or arguments insubstantial, it issues an irrevocable decision to continue the trial using this procedure.

The defense is entitled to be present with their client at the location of the hearing and/or before the competent judicial authority.



*The registrar of the penal institution drafts a report on the procedure's execution, which is signed and then sent by the head of the penal institution to the competent judicial authority to be annexed to the case file.*

*If one of the parties or their defense requests the judicial authority to use video conferencing, the authority decides on the request after consulting the other parties, their defense, and the public prosecution. However, it may revise its decision if new circumstances arise after the request was made.*

*Should the trial proceed with video conferencing and the non-detained accused refuses to respond or decides not to attend, the judgment is considered in absentia. Video conferencing can also be used when pronouncing judgments, making the judgment in these cases considered as in presence.*

*It is noteworthy that the number of detainees tried via video conferencing technology in the Algiers High Court and its subordinate courts during the year 2020 reached 7273, while for the Tipaza High Court and its subordinate courts from January 2 to December 28, 2020, the number was 2968 detained accused.<sup>16</sup>*

*These figures and data reflect the objectives outlined by the Ministry of Justice in its roadmap, aiming to expand remote electronic services and provide immediate information to citizens, eliminating centralized filing procedures for various types of files. This includes developing and enhancing a specialized internal communication network for the justice sector, connecting the central administration with all judicial authorities and penal institutions, as well as supervised bodies, via optical fibers.*

*This infrastructure is essential for utilizing various information systems. In this context, numerous projects have been realized to achieve modern justice by international standards, which include:*

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<sup>16</sup> "Remote Trial... The Balance of Justice in the Time of the COVID-19 Pandemic," Official Ministry of Justice Facebook page, date: March 14, 2021, time: 14:40.



## **A- Realizing Digital Justice:**

- *Adoption of electronic authentication and signature technologies in the judicial field, in accordance with Law No. 15-03, dated February 1, 2015, concerning the modernization of justice. This was achieved through the creation of an Electronic Signature Personalization Center and the establishment of an Electronic Certification Authority, enabling all participants in the sector to authenticate administrative documents and judicial writings with a reliable electronic signature, with the aim of providing remote judicial services.*
- *Enabling citizens to obtain electronically signed Extract No. 03 of the criminal record and the nationality certificate via the internet and through diplomatic and consular representations abroad. This service commenced on Monday, February 15, 2021, and is exempt from any judicial fees, pursuant to the provisions of the 2020 Finance Law.*
- *Allowing lawyers to download the standard version of judgments and judicial decisions signed electronically via the internet.*
- *Providing a service for the retrieval of the standard version of decisions issued by the Supreme Court and the State Council, electronically signed and available from the judicial councils, eliminating the need for physical travel to the issuing judicial entity.*
- *Offering an electronic rectification service for errors in civil status records, enabling citizens to submit correction requests and accompanying documents via the internet or at the nearest court or municipality, as well as at diplomatic missions or consulates abroad.*
- *Continuing the digitization of the judicial file in all its stages, including the electronic exchange of petitions outside of court sessions.*

- *Providing the ability to track the progress of cases and access judgment texts via the Ministry of Justice's electronic portal.*
- *Opening electronic addresses to allow citizens to benefit from remote judicial services, and offering a verification service for the authenticity of judicial documents, electronically signed and retrieved via the internet.*
- *Establishing a call center with a dedicated number for the justice sector to address citizens' and litigants' concerns and answer their inquiries related to judicial and legal fields, accessible through the toll-free number (10-78).*
- *Enabling various administrations and public bodies to access and retrieve the criminal record (Card No. 2), electronically signed.*
- *Improving revenue collection methods by adopting a mechanism for the collection of fines and judicial expenses by judicial entities, based on an integrated automated system and a national database, along with incentives for executing judicial decisions, allowing beneficiaries to opt for installment payments and receive a discount on amounts due for voluntary payment.*
- *Creating a platform for remote training.*
- *Launching the "e-nyaba" electronic prosecution platform, enabling individuals or legal entities (administrations, institutions, private companies, associations, etc.) to submit complaints or petitions to the prosecution remotely.<sup>17</sup>*
- *This platform also allows citizens to submit other requests not directly related to known criminal complaints but rather intervention requests, inquiries about judgments, requests for information, etc. Here, the prosecution informs citizens about these services and tracks the progress of their petitions.*

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<sup>17</sup> [www.mjustice.dz](http://www.mjustice.dz)



- Tracking the progress of complaints and petitions through the electronic prosecution platform means saving time, effort, and money.

The new digital platform has seen significant interaction from citizens, with the number of complaints sent through the electronic prosecution at the Tipaza High Court and its subordinate courts reaching 56 by the end of 2020, and the Algiers High Court receiving more than 230 complaints, nearly 310 complaints in total across its courts. These complaints were addressed promptly.<sup>18</sup>

### ***B - Adopting a Centralized Information System for Automated Data Processing Related to Judicial Activity:***

- The creation of a unified and secure information system specific to the sector to ensure the coherence and compatibility of data for easier utilization and to avoid data duplication.
- The adoption of video conferencing technology for organizing remote trials, both nationally and internationally, has significantly facilitated judicial procedures and accelerated the pace of case resolutions. This is done through remote hearings of witnesses, parties, and experts, and avoiding the transfer of detainees.
- Using the same mechanism to organize work sessions, lectures, and training courses.

### ***C - Developing Judicial Administration Management Methods:***

- Adopting an electronic management system for administrative and judicial documents and civil status registers held at the judicial

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<sup>18</sup> "Remote Trial... The Balance of Justice in the Time of the COVID-19 Pandemic," previous site.



councils, aiming for optimal utilization of the sector's archives and contributing to the realization of electronic administration.

- *Sending documents and exchanging information using the sector's internal email.*
- *Implementing a mechanism for sending expert reports signed electronically and exchanging documents electronically among judicial authorities and the scientific services of the judicial police.*
- *Adopting a mechanism for electronic document and judicial procedure transmission, enabling judicial authorities to send summons electronically instead of traditional legal methods, informing the litigant of their case outcome, and various information concerning them via simple text messages.*

#### ***D - Strengthening Individual Rights and Freedoms:***

*Establishing a central service for genetic fingerprints, managed by a judge and supported by a technical cell, overseeing the creation and management of the national database for genetic fingerprints, according to Law No. 16-03, dated June 19, 2016, related to the use of genetic fingerprinting in judicial procedures and identification of persons, ensuring legal protection for the stored genetic data.*

*Introducing a biometric information system based on the exploitation of biometric fingerprint characteristics and a national biometric database covering all individuals judicially pursued and inmates of penal institutions, contributing to identity recognition in record time and enhancing the flexibility and speed of judicial procedures, as well as facilitating the management of penal institutions and preventing identity theft.*

*Establishing an automated system aimed at combating child abduction, allowing for the announcement of a child abduction alert through various media*

outlets, for widespread dissemination of information instantly and remotely, and assisting in search and investigation procedures by all segments of society.<sup>19</sup>

## **Conclusion:**

*Algeria is engaged in the international effort to simplify and facilitate administrative procedures as part of the fight against bureaucratic practices that have burdened citizens and to achieve comprehensive digitization. The Algerian Constitutional Court is among the constitutional institutions accompanying this digital transformation by updating its internal electronic work system to achieve a digital Constitutional Court. As for the justice sector, it is on the path to gradually phasing out paper-based processes and relies on a progressive approach that ensures results comparable to those achieved by developed countries in the field.*

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<sup>19</sup> [www.mjustice.dz](http://www.mjustice.dz)

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## ***L'olivier des œufs, témoin de l'autonomie financière de la femme djerbienne***

**Imed BEN SALAH**  
*Université de Tunis*

### **Résumé**

*Située dans la petite Syrte, croisement des routes africaines et méditerranéennes depuis la plus haute Antiquité, l'île de Djerba fut un carrefour des routes commerciales, une plaque tournante entre l'Afrique et le reste du monde méditerranéen<sup>20</sup>. Non loin du continent et grâce à ses 124 Km de côtes, Djerba baigne profondément dans le monde méditerranéen, berceau de grandes civilisations. Son insularité ne l'a pas isolée du continent, et sa morphologie a facilité son invasion<sup>21</sup>. L'île a de temps joué un rôle stratégique en tant que lieu de métissage culturel où se sont côtoyées de nombreuses civilisations.*

### **Mots-clés**

*l'île de Djerba, l'autonomie financière, des routes commerciale, métissage culturel, civilisations, capitale maritime, femme djerbienne, L'olivier des œufs*

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<sup>20</sup> TMARZIZET, (Kamel), *Si Djerba m'était contée*, STD, Tunis, 1980, p 7.

<sup>21</sup> DELMAS, (Yves), « L'île de Djerba », in *Les Cahiers d'Outre-Mer*, n° 18, Paris, 1952, pp 149-168.

## Introduction

Commerçants par nature, les Djerbiens sillonnent les terres et les mers ; à l'époque Punique déjà, Djerba était capitale maritime. Ses multiples ports dont les vestiges sont encore visibles accueillait les navires carthaginois qui venaient nombreux y chercher des produits localement manufacturés : des bijoux<sup>22</sup>, des étoffes<sup>23</sup> et des énormes amphores de vin et de l'huile d'olive<sup>24</sup>. Par ailleurs, c'est d'El Kantara, appelée jadis « Tariq Al Jimal » signifiant la route des dromadaires, que les caravanes regagnaient le continent avant de s'enfoncer lentement dans le grand désert<sup>25</sup>. Elles revenaient chargées d'esclaves, de peaux de bêtes, d'œufs et de plumes d'autruches, d'ivoire et de métaux précieux. En contrepartie, elles emportaient divers produits agricoles et artisanaux : huiles d'olive, vin, poissons séchés, éponges, poteries, bijoux, étoffes richement teintées.<sup>26</sup>

Pleinement ouverte sur le monde méditerranéen par sa position stratégique, Djerba demeure l'île de l'originalité à plus d'un titre. Cette originalité peu controversée, est facilement remarquée par l'étranger à l'île. Ainsi, nulle part ailleurs on ne peut trouver autant de variété de maisons et de mosquées en parfaite harmonie avec le cadre naturel. Nulle part ailleurs, on ne voit d'ateliers dont le fronton surmontant la porte rappelle les chapeaux de

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<sup>22</sup> BEN SALAH, (Imed), *Les bijoux traditionnels djerbiens : patrimoine culturel et civilisationnel à préserver, Mémoire de DESS en Patrimoine et Archéologie, Faculté des Lettres de Manouba, 1997, p 24.*

<sup>23</sup> GOLVIN, (Lucien), *Aspects de l'artisanat en Afrique du Nord, Paris, P.U.F, 1957, p 81.*

<sup>24</sup> COMBES, (Jean-Louis) et LOUIS, (André), *Les poteries de Djerba, Tunis, Centre des Arts et Traditions Populaires, 1967, p 52.*

<sup>25</sup> H'BAIEB, (Mohamed Ali), « A propos des voies entre l'île de Djerba et la presqu'île de Zarzis ; des nouvelles données de la chaussée romaine et Tariq al-gimâl », in *Le réseau routier dans le Maghreb Antique et Médiéval, Faculté des Lettres et des Sciences Humaines de Sousse, 2015, pp 139-158.*

<sup>26</sup> LOUIS, (André), « Jerba », in *Les costumes traditionnelles en Tunisie, MTE, Tunis, 1988, p 185.*



*paille des femmes djerbiennes*<sup>27</sup>. Djerba reste enfin, l'un des rares berceaux des oliviers plusieurs fois centenaires mais encore féconds et productifs ainsi que des palmiers qui balancent leurs palmes au-dessus d'une mer au bleu incomparable.

Tombés sous le charme de l'île, plusieurs voyageurs et admirateurs sont tellement fascinés par sa remarquable beauté et son particularisme à telle enseigne qu'ils ont considéré Djerba comme un monde à part, ou comme « une entité différente du reste du pays »<sup>28</sup>. D'autres, croisant pour la première fois une femme djerbienne drapée dans un long voile de soie richement coloré et décoré qui la dissimule entièrement, furent frappés par la collection de bijou traditionnelle et le chapeau de paille à larges bords et à calotte pointue qui n'existe nulle part ailleurs et auquel ont attribué le nom de pétase au lieu de « Mdhalla ».

Si la singularité de l'île de Djerba apparaît à tous les niveaux du patrimoine matériel, elle se vérifie clairement au niveau de son patrimoine immatériel et notamment au niveau du mode de vie de ses habitants. Dans une île remarquablement conservatrice et dominée par une société insulaire et masculine, la femme ne s'éclipse pas de la vie publique. Ce paradoxe est justifié à la fois par plusieurs facteurs d'ordre historique et sociale. Ainsi, la femme djerbienne participe activement à l'économie de la famille, ce qui lui a permis de s'imposer et de réaliser une certaine autonomie financière. Ce constat attesté peut se vérifier à travers les mythes et les légendes tissés par l'imagination fertile de ses habitants autour de divers oliviers séculaires éparpillés arbitrairement dans tout le paysage djerbien. Parmi ces derniers citons notamment celui de Zitounet Laadham, situé au cœur du marché de Midoun et signifiant littéralement l'olivier des œufs.

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<sup>27</sup> COURTIN, (Caroline), *Djerba ; un regard de l'intérieur*, Paris, 2002, p 112.

<sup>28</sup> GARGOURI, (Samira), « Le bijou traditionnel à Djerba », in *DirassethaoulajaziratJerba, Association pour la Sauvegarde de l'Île de Djerba*, 1996, p 35.

Compte tenu de la spécificité de ce bel arbre béni dans l'imaginaire populaire tunisien et méditerranéen, du rapport de la Tunisie à son environnement économique, géographique et de l'importance de l'olivier dans la conscience populaire, nous accordons depuis plusieurs années une importance particulière à ce sujet novateur. C'est ainsi que nous nous sommes plongés dans l'étude des oliviers séculaires en Tunisie en général, et particulièrement sur l'île de Djerba, l'un des berceaux les plus anciens de ces arbres plusieurs fois millénaires. Outre la dominance des oliviers séculaires sur son oliveraie, ces derniers participent largement à la mise en scène du paysage djerbien et sont caractérisés surtout par leur éparpillement arbitraire sur toutes les régions de l'île.

L'olivier de Midoun était au centre de cette étude de terrain et un choix stratégique pour nous. En effet, c'est l'un des plus anciens oliviers de ce petit village, auquel sont attachées des histoires drôles et de beaux souvenirs, au point qu'il est devenu porteur de la mémoire de nombreuses générations d'habitants de Midoun. La détérioration de son état aujourd'hui suite au changement de sa fonction nous impose la responsabilité de présenter son passé prospère et de le comparer à son sombre présent. Notre objectif est d'attirer l'attention sur cet arbre vénérable, non seulement pour faire prendre conscience de sa valeur culturelle, mais aussi pour le sauver des griffes des usurpateurs, en élaborant un plan réfléchi pour lui redonner sa dignité en l'exploitant judicieusement de manière responsable. Dans cette recherche, nous aborderons les problèmes suivants :

- *Quel est le secret de cette appellation « l'olivier des œufs » ?*
- *Quel est son rôle et comment a-t-il changé entre le passé et le présent ?*

### ***I – Djerba berceau des oliviers séculaires porteurs de mémoire***

Remontant à la plus haute Antiquité, l'olivier est un arbre qui appartient à toute l'humanité. C'est aussi l'icône méditerranéenne par excellence. Georges Duhamel l'a considéré comme arbre marqueur de la Méditerranée en disant : «



la Méditerranée s'arrête là où l'olivier ne pousse plus »<sup>29</sup>. Sa présence est tellement ancrée dans la culture de tous les peuples méditerranéens, qu'il devient sacré chez tous les peuples anciens et dans toutes les croyances. À partir de là, lorsque notre Maître Noé a navigué dans la rivière, il a d'abord relâché un corbeau pour explorer les lieux. Mais il s'est envolé et n'est pas revenu, et depuis cette date, le corbeau, avec sa couleur noire, est symbole de malchance et de fuite. Dans une nouvelle tentative, il a envoyé une colombe d'un blanc éclatant, qui est revenue au navire avec les pattes enduites de boue et un rameau d'olivier dans le bec comme preuve de leur proximité avec la terre. Depuis cette date, l'image de la colombe et du rameau d'olivier sont associés à l'idée du salut, et ils deviennent rapidement l'icône de la paix par excellence.

Les peuples ont hérité la sagesse selon laquelle l'olivier est un arbre sacré, comme l'ont fait les Cananéens, les Grecs, les Romains, les Amazighs et plusieurs autres peuples anciens. De nombreux mythes et légendes ont été tissés et ont formé une culture de vie avec la prégnance symbolique de l'arbre, le transformant d'un objet économique à un symbole social voire à une véritable icône culturelle. Dans ce contexte, ce bel arbre béni peut être considéré comme un livre d'histoire ouvert sur le passé, le présent et le futur, comme s'il s'agissait d'un voyage géoculturel pour mettre en valeur la présence de l'olivier dans l'imaginaire populaire et la mémoire collective des peuples.

Les mythes ont entouré l'olivier depuis la plus haute Antiquité, jusqu'à ce que ce bel arbre devienne le symbole de tout le bassin méditerranéen, « cet arbre enchanteur aux feuilles d'argent », comme l'appelait l'historien grec « l'Ancien Sophocle » depuis le Ve siècle avant JC. Djerba, compte tenu de sa situation au sud-est de la Tunisie, était le lien entre le monde méditerranéen et les routes du commerce caravanier transsaharien à travers l'arc romain. A partir de là, elle a été largement influencée par les multiples civilisations méditerranéenne et saharienne. L'olivier est l'arbre roi par excellence qui règne sur tout le pourtour

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<sup>29</sup>DUHAMEL, (Georges), *Homère au XXème siècle*, Paris, Union Latine d'Editions, 1947, p 38.



de l'île, il participe largement de sa prospérité contribuant à nourrir sa population.<sup>30</sup>

Les habitants des îles étant en général attachés à leur spécificité identitaire, cela est tout à fait vrai pour les Djerbiens. En effet, ils sont connus dans tous les pays et à travers les âges pour leur tempérament doux, en particulier pour leur esprit et leurs caractéristiques insulaires profondément enracinées, y compris les anciennes coutumes et traditions.<sup>31</sup> Autant ouverts sur la mer, et surtout sur l'autre, les Djerbiens ont prouvé qu'ils constituent un groupe authentique qui ne se nourrit pas uniquement de ses racines et ne renie pas ses coutumes profondément ancrées dans l'histoire.<sup>32</sup>

Lorsque nous parlons de coutumes, nous cherchons à étudier le code social et culturel associé à l'olivier, que ce soit dans l'imaginaire populaire ou dans le patrimoine culturel des habitants de l'île, qui bénéficient d'un climat et d'une histoire uniques. Il s'agit d'une caractéristique unique qui leur confère un modèle social, culturel et civilisationnel différent du reste du continent. Ce modèle se décline au travers de la réalité géographique et sociologique de l'île ainsi que par la nature de l'architecture et la formation de l'espace. Outre sa valeur matérielle et son rendement économique, l'olivier de l'île de Djerba n'est pas un arbre ordinaire, mais reste plutôt l'arbre symbole par excellence.

Contrairement aux autres arbres, la relation de l'homme avec l'olivier dépassait une relation étroite, utilitaire et pragmatique pour devenir une relation spirituelle et symbolique pleine de significations. Ce n'est pas un arbre ordinaire dont on prend soin pour récolter ses fruits et les utiliser comme nourriture, médicament et beauté. La profondeur de cette relation éternelle tient au fait que l'olivier de Djerba est l'arbre de vie par excellence. Il représente la vie dans sa permanence et sa continuité, comme en témoigne la présence de nombreuses

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<sup>30</sup> TLATLI, (Slaheddine), *Djerba l'île de Lotophage*, Tunis, Cérés Productions, 1967, p 55.

<sup>31</sup> BERTHELON, (Lucien), « *Exploration anthropologique de l'île de Gerba* », in *L'anthropologie*, Paris, Librairie de l'Académie de Médecine, 1890, pp 318-326.

<sup>32</sup> TMARZIZET, (Kamel), *Djerba l'île des rêves*, Tunis, Editions Stag, 1997, p 18.

*coutumes et traditions transmises de génération en génération, et qui gravitent autour de cet arbre béni dans les différentes étapes du cycle de vie et pendant ses grandes stations.*

*Ainsi, l'olivier est un livre ouvert, contenant dans ses pages un ensemble de rituels, de coutumes et de comportements sociaux et culturels. L'histoire de l'île de Djerba, cette île de charme imprégnée des profondeurs du patrimoine et de l'histoire méditerranéens, était un terrain fertile qui explique la quête des voyageurs depuis l'Antiquité pour visiter l'île. Elle a retenu leur attention en raison de sa situation stratégique dans le Golfe de Syrte Petit ou aujourd'hui le Golfe de Gabès<sup>33</sup>. Les oliviers sont connus sur l'île bien avant la période phénicienne, ce qui signifie qu'ils sont chargés d'histoire et ont contribué de manière efficace et significative à façonner l'espace et le paysage naturel de l'île. Tout au long de l'histoire, plusieurs rituels et légendes ont été tissés autour de ces beaux oliviers séculaires et se prolongent jusqu'à aujourd'hui à travers un certain nombre de coutumes, de traditions et d'héritage oral.<sup>34</sup>*

## **II – L'olivier des œufs : lieu de rencontre, d'échange et de sociabilité**

*Il s'agit d'un immense olivier plusieurs fois centenaires qui trône majestueusement, au milieu du marché hebdomadaire qui se tient tous les vendredis à Midoun, Outre sa taille immense et sa situation dans une place stratégique au milieu du marché, il est remarquable à la fois par sa grande taille, la beauté de son allure et la diversité des formes sculptées sur son énorme tronc, qui en font non seulement un point de rencontre pour les habitants du village, mais plutôt un phare et un repère porteur de mémoire.<sup>35</sup>*

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<sup>33</sup> BEN OMRANE, (Sadok), *La petite Syrte et la Tripolitaine à l'époque Punique*, Thèse de Doctorat en Histoire, Université Paris-Sorbonne, 1995, p 24.

<sup>34</sup> AYOUB, (Abderrahman), *Signes et Symboles en Tunisie*, Tunis, Agence de Mise en Valeur du Patrimoine et de la Promotion Culturelle, 2001, p 46.

<sup>35</sup> BEN SALAH, (Imed), *Signes et symboles de l'olivier à l'île de Djerba*, Thèse de Doctorat en médiation culturelle et techniques de l'animation, Institut Supérieur de l'Animation pour la Culture et la Jeunesse de Bir El Bey, 2021-2022, p 268.



*Précisons d'emblée que tous les oliviers séculaires de l'île de Djerba portent des noms. Ce sont pour la plupart des noms très anciens et chargés de symboles et de significations. Bien entendu, notre olivier, objet de l'étude, ne fait pas exception à ce principe. Faute d'études dans ce domaine, et pour résoudre le mystère de ce nom, il a fallu interroger la mémoire collective. Nous avons donc mené un travail de terrain couronné par la réalisation d'une série d'entretiens avec les anciens de ce village. Les réponses ont été spontanées, nombreuses et variées, et confirment une hypothèse authentique. C'est que cet olivier abritait les femmes vendeuses des œufs le jour du marché hebdomadaire du village.*

*Ce témoignage se distingue à la fois par son humour et son caractère avant-gardiste et sérieux. Car ses auteurs nombreux attribuent l'origine du nom à un phénomène unique. En effet, cet olivier séculaire tire son nom du fait qu'il était le siège du marché aux œufs des femmes, qui se tenait chaque vendredi matin, jour de marché hebdomadaire à Midoun. Dans ce contexte, il convient de rappeler que les femmes de l'île de Djerba, autant qu'elles étaient conscientes, sages dans leur comportement, responsables et travailleuses dans leurs foyers, travaillaient dur dans divers métiers artisanaux tels que la broderie et le filage de la laine ou dans l'agriculture familiale. Elles ont monopolisé certains produits agricoles, qu'ils vendent eux-mêmes sur le marché et s'approprient la compensation financière. Pour citer sans s'y limiter, nous citerons ces exemples précis : le bétail, la volaille, le henné et les fleurs des grenadiers appelés localement « Lallouch », et qui sont utilisées notamment dans la teinture de la laine et des tissus. Ainsi, les Djerbiens se singularisent par cette particularité et se distinguaient du reste des sociétés traditionnelles qui opprimaient les femmes en les privant d'aller au marché.<sup>36</sup>*

*A l'instar de toutes les sociétés traditionnelles, la société djerbienne disposait d'un ensemble de réglementations et de lois fondées sur des conventions sociales coutumières. Parmi ces règles figurent l'abstention de l'homme de s'approprier certains produits agricoles, et son abandon volontaire*

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<sup>36</sup>GOUJA, (Zouheir), *Communauté noire et traditions socioculturelles ibadhite de Djerba*, thèse en ethno-musicologie, université de Paris VIII, 1996, p 69.



en faveur de la femme, comme les brebis, les poules, le henné, les fleurs des grenadiers et autres. Cela nous confirme le leadership de la femme expérimentée dans ce domaine, car elle était libre et jouissait d'une autonomie financière indépendante de celle des hommes. Elle a la liberté absolue de disposer de tous ses biens en achetant, vendant, troquant, hypothéquant ou s'installant, sans aucune interférence de la part de l'homme. Divers témoignages oraux nous ont confirmé que la femme djerbienne tient à économiser l'argent qu'elle gagne pour s'acheter divers objets personnels, notamment des bijoux ou des cosmétiques traditionnels (khôl, parfum, encens, etc).

Toutes les informations collectées affirment également que les femmes portent souvent les fardeaux de la famille en cas de besoin, comme aider leur mari en cas de crise ou contribuer à préparer le trousseau de leurs filles avant le mariage. Comme par exemple leur acheter des bijoux, des vêtements traditionnels ou des couvertures en laine. La femme djerbienne travaille également dur et économise de l'argent pour collecter suffisamment d'argent pour accomplir le pèlerinage à la Mecque ou pour aller à la omra. Pendant de nombreuses décennies, les grands-mères se rassemblaient à l'ombre de cet olivier luxuriant et s'asseyaient fièrement pour vendre des œufs qui dépassaient les besoins de la famille pendant une semaine, et peut-être pour communiquer et échanger des nouvelles du village.

Ce témoignage est d'une importance primordiale, dans la mesure où il nous fournit une preuve ethnographique de la situation de la femme djerbienne et de son statut social dans une société insulaire et conservatrice. Héritière de la femme amazighe<sup>37</sup>, la femme djerbienne disposait d'une certaine autonomie financière. Cela d'autant plus qu'elle était libre de sortir, d'exercer des transactions commerciales voire même de divorcer de son mari absent depuis plusieurs années. Ainsi, il lui suffisait de se présenter dans la mosquée devant un Imam et exprimer son désir de divorce en apportant la preuve de l'absence du

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<sup>37</sup> CAMPS, (Gabriel), *Les berbères ; mémoire et identité*, Parsi, Editions Errance, 1987, p 28.

mari pendant trois ans successifs. Notons que la jurisprudence est constante dans ce sujet.

### **III - Diversité des rôles : de l'économique au social et récréatif**

Particulièrement fécond, le travail de terrain qui a duré plusieurs mois nous a permis de collecter de précieuses informations à notre étude. Ainsi, la richesse de la matière et la diversité des rôles confirment inévitablement l'importance de ce bel olivier étudié. Il s'est avéré qu'il occupe une place centrale dans le village tellement il domine l'espace du marché hebdomadaire, qu'il présente un lieu favori pour toutes les femmes du village qui viennent nombreuses chaque vendredi non seulement pour vendre les œufs récoltés durant une semaines, mais aussi pour se distraire, communiquer avec le monde extérieur et surtout pour échanger les nouvelles du village. Certes, cette diversité des rôles nous permet de découvrir l'importance de cet olivier exceptionnel qui plonge ses racines profondément à la fois dans le sol de l'île et dans la mémoire de ses habitants.<sup>38</sup>

Malgré de légères différences dans les détails des récits, il existe un consensus sur sa fonction économique, dans la mesure où l'olivier des œufs le jour du marché hebdomadaire, était la destination de tous les villageois : hommes et femmes, vieux et jeunes, musulmans et juifs. Par ailleurs, cette fonction économique, à son tour, n'est pas dénuée de dimensions sociales profondément ancrées, qui se manifestent sous de multiples formes. L'olivier est devenu bien plus qu'un simple arbre où les gens cherchent refuge et abri contre la chaleur en été et le froid en hiver. Il est devenu plutôt un lieu chargé de souvenirs et porteur de mémoire et de nobles valeurs. Car il représente un point de rencontre, d'acculturation, de prise de rendez-vous divers, de conclusion d'accords rentables, d'échange d'expériences et de communication avec les autres. Cet autre multiple qui dépasse le critère de race, de religion, de couleur et de sexe, embrasse l'humain et l'universel.

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<sup>38</sup> BEN SALAH, (Imed), « L'olivier porteur de mémoire et de valeurs d'usage », in *Pensée Méditerranéenne*, Université de Tlemcen, n° 4, mai 2013, pp 53-67.



Dans ce même contexte, on ne peut manquer de rappeler que l'ensemble de ces fonctions se caractérise, outre la multiplicité et la diversité, par l'intégration et l'identification. En effet, chacune de ses fonctions est complémentaire de l'autre, et il n'y a pas de preuve plus claire de cela que cette belle harmonie entre le rôle économique et le rôle social, y compris le rôle culturel et de divertissement. Ensuite, ce qui marque la diversité de ces symboles c'est la progression de l'environnement le plus étroit vers l'environnement le plus complet. Cela va des dimensions locales et régionales aux dimensions nationales et mondiales.<sup>39</sup>

C'est le meilleur exemple vivant qui reflète en profondeur le mode de vie de l'île de Djerba, le caractère insulaire de ses habitants et l'originalité de leurs traditions et coutumes. C'est là où l'olivier est l'arbre roi par excellence. Il rayonne sur tous les aspects de la vie, couronne le cycle de la vie et siège humblement sur son trône. Il ne s'agit pas simplement d'un objet naturel ni d'un arbre ordinaire, mais il est plutôt traité avec amour et respect comme un être vivant qui s'élève au niveau d'un être humain en termes de valeur et d'être. Ici, l'olivier est élevé au rang d'être humain et traité exactement comme une belle femme. Il devient un symbole de beauté époustouflante par sa forme circulaire qui suggère les idées de fertilité, de générosité, de l'abondance, de don et de la vie au travers de la permanence et de la verdure continue.<sup>40</sup>

Néanmoins de nos jours, ce bel olivier séculaire a changé de rôle depuis quelques décennies. Avec l'essor du tourisme dans l'île de Djerba, les vendeurs de céramique ont occupé les lieux et ont remplacé les femmes qui viennent chaque vendredi vendre leurs œufs et communiquer avec les autres femmes pour se distraire et échanger les nouvelles du village. Ces nouveaux occupants ont installé leurs étagères métalliques autour de son immense tronc pour exposer

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<sup>39</sup>BEN SALAH, (Imed), *Signes et symboles de l'olivier à l'île de Djerba*, Thèse de Doctorat en médiation culturelle et techniques de l'animation, Institut Supérieur de l'Animation pour la Culture et la Jeunesse de Bir El Bey, 2021-2022, p 314.

<sup>40</sup>BEN SALAH, (Imed), « L'olivier rayon d'espoir des femmes djerbiennes solitaires épouses d'immigrés », in *Femmes, Migration et Identité : Expériences et Perspectives*, Faculté polydisciplinaire d'Errachidia, 2023, pp 71-97.



leurs articles. Cette pratique abusive a porté largement atteinte à l'olivier, dans la mesure où il devient tellement menotté et privé de l'air et de la lumière que son énorme tronc est attaqué par les insectes et les maladies. En changeant de rôle, l'olivier des œufs est agressé par ces nouveaux occupants qui ne sont pas conscient de sa valeur inestimable. Ils sont encore peu sensibles à ses souffrances et du mal qu'ils peuvent lui causer par l'installation de leurs étagères autour de son énorme tronc de plus de deux mètres de diamètres.

Certes, ce comportement irresponsable l'a privé de l'air et de la lumière voire asphyxier ses racines et porter atteinte à son tronc attaqué par l'humidité et rongé par les parasites. Tel était à Midoun ce bel olivier ancestral où se rencontrent les femmes vendeuses d'œufs. Chaque jour du marché elles venaient nombreuses s'installer sous son ombre pour vendre leurs œufs, gagner quelques sous pour subsister. De là, nous pouvons découvrir le rôle économique, social et culturel de cet olivier en détresse. Par ailleurs, nous soulignons le statut social de la femme djerbienne qui en remplaçant le mari absent, assume une grande responsabilité non seulement pour éduquer et nourrir les enfants mais aussi pour s'occuper des parents malades et âgés. Elle fait des économies et s'active pour améliorer les ressources familiales non seulement pour répondre à ses propres besoins, mais également pour participer au financement de divers projets familiaux. Si autrefois, sous l'ombre de cet olivier ancestral se concluaient des affaires et se déroulaient des transactions commerciales et symboliques<sup>41</sup> qui apportaient aux femmes de l'argent et des réjouissances originales, aujourd'hui nous sommes tous responsables de son état misérable et nous devons lutter contre ces agresseurs pour le sauver et valoriser son rôle culturel et civilisationnel.

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<sup>41</sup> BAKLOUTI, (Naceur), "L'eau, l'œuf et le poisson ou la trilogie de la fécondité", in *La femme tunisienne à travers les âges*, Tunis, Institut National du Patrimoine, 1997, pp 160-166.

#### **IV – La femme Djerbienne victime d'un mode de vie conservateur**

Face à la pauvreté du sol et au manque des pluies<sup>42</sup>, l'économie de l'île ne peut plus compter sur l'agriculture. Pour diversifier leurs sources, les Djerbiens ont eu recours à d'autres métiers tels que l'artisanat et le commerce. Toutefois, l'économie local demeure limitée ce qui a obligé les hommes à quitter leur île natale à la recherche de nouveaux horizons dans d'autres villes en Tunisie et à l'étranger<sup>43</sup>. Depuis la plus haute antiquité, la migration était l'unique choix pour les hommes djerbiens pour subsister et gagner leur vie<sup>44</sup>. Ils voyageaient dans les contrées les plus lointaines pour exercer le commerce avec une grande habilité<sup>45</sup>. Grâce à leurs qualités physiques et morales, ils excellaient au petit commerce, au point qu'ils monopolisaient le secteur du commerce de détail, en Tunisie. Selon le professeur Slah Eddine Tlatli, « Les commerçants djerbiens doivent leur succès à leur honnêteté scrupuleuse, à leur esprit d'organisation rationnelle (...) et à une grande souplesse dans l'adaptation aux circonstances économiques nouvelles »<sup>46</sup>. D'ailleurs, le terme « Jerbi » indique dans plusieurs villes en Tunisie, l'épicier de la citée chez lequel on peut s'approvisionner aisément à crédit !

Dans une société insulaire et particulièrement conservatrice, ce modèle économique a imposé des valeurs sociales rigides fondées sur des règles coutumières peu compréhensives. Ainsi, les traditions imposent le fait que les hommes devraient partir tous seuls, sans accompagner leurs femmes ni leurs enfants. Ces derniers devaient subir ce choix social, en restant dans l'île attendre

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<sup>42</sup> Appartenant à une zone aride, l'île de Djerba ne reçoit que 180 ml de pluie par an.

<sup>43</sup> BERNARD, (Elise), « Djerba, tourisme international et nouvelles logiques migratoires », in *Revue Européenne des Migrations Internationales*, n° 18, Marseille, 2002, pp 103-112.

<sup>44</sup> TMARZIZET, (K), *Djerba l'île des rêves*, Tunis, Editions Stag, 1997, p 95.

<sup>45</sup> BOUBAKRI, (Hassan), *Le petit commerce immigré du sud Tunisien à Paris : espace, fonctionnement social et impact sur les régions natales*, Thèse de Doctorat en géographie, Université de Strasbourg, 1985, p 147.

<sup>46</sup> TLATLI, (Slah Eddine), *Djerba l'île de Lotophage*, Tunis, Cérés Productions, 1967, p 14.



avec patience le retour des maris absents<sup>47</sup>. Cette absence qui peut durer plusieurs mois, voire plusieurs années est particulièrement rude pour les jeunes couples. En effet, ils doivent supporter en plus de l'éloignement, le manque sentimental et la carence affective. Durant l'absence des hommes, les femmes supportent des charges sociales et économiques variées. En effet, elles assument une lourde responsabilité, puisqu'elles doivent s'occuper non seulement de l'agriculture familiale mais aussi de l'éducation des enfants et des multiples besoins des parents âgés et de plus en plus infirmes.<sup>48</sup>

Fruit d'un système économique et social rigide et d'une mentalité rigoureuse, ce modèle de vie imposé aux jeunes couples djerbiens n'est pas sans conséquences psychologiques et sociales désastreuses. Plusieurs générations ont payé cher la contrepartie de ce choix austère. Certes, les jeunes épouses sont les premières victimes, puisqu'elles doivent supporter le fardeau de nombreuses charges sociales dans une société masculine peu compréhensive. Elles sont privées non seulement de l'affection de leurs époux, mais elles sont également condamnées sur le plan social. Puisqu'elles sont contraintes à une vie ascétique en évitant toute manifestation de joie, de parure et surtout de maquillage<sup>49</sup>. Parallèlement, ces jeunes femmes solitaires font l'objet de concupiscence et d'harcèlement de la part de nombreux hommes arrogants qui n'hésitent pas à les traquer en offrant toute sorte de tentation. D'ailleurs, ce phénomène socialement

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<sup>47</sup> STABLO, (René), *Les djerbiens ; une communauté arabo-berbère dans une île de l'Afrique française, Tunis, S.A.P.I, 1941, p 60.*

<sup>48</sup> BEN SALAH, (Imed), « L'olivier rayon d'espoir des femmes djerbiennes solitaires épouses d'immigrés », in *Femmes, Migration et Identité : Expériences et Perspectives, Faculté polydisciplinaire d'Errachidia, 2023, pp 71-97.*

<sup>49</sup> ANDRE, (Louis), « Jerba », in *Les costumes traditionnelles en Tunisie, MTE, Tunis, 1988, p 183.*



néfaste, a fait l'objet de nombreuses recherches académiques<sup>50</sup> et travaux cinématographiques.<sup>51</sup>

## **Conclusion**

De ce fait, nous pouvons conclure que la forte personnalité de la femme djerbienne lui a permis de s'imposer malgré les restrictions sociales et religieuses d'une société insulaire et particulièrement conservatrice. Ainsi, elle a arraché son autonomie financière bien méritée grâce à son sérieux, à ses compétences et ses sacrifices pour prêter main forte à son mari qui peut s'absenter durant plusieurs mois voire plusieurs années pour améliorer la fortune de la famille. Ainsi, pour assurer l'avenir des enfants, les couples djerbiens sont toujours prêts à des sacrifices en supportant l'éloignement physique et la précarité sentimentale<sup>52</sup>. Pour persévérer et survivre dans cette situation, la femme djerbienne se réfère à la nature de l'île pour s'inspirer de ses arbres, recevoir des leçons de résistance et particulièrement de l'olivier porteur des nobles valeurs communes.

Selon ce concept, L'olivier des œufs représente pour ces femmes résistantes un endroit de rencontre et un lieu chargé de mémoire. Ce n'est pas un

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<sup>50</sup> SIMON, (Gildas), *L'espace des travailleurs tunisiens en France : structure et fonctionnement d'un champ migratoire international*, Thèse de Doctorat en Sociologie, Université de Poitiers, 1978, p 245

<sup>51</sup> En décembre 2000, Moufida Tlatli, réalise son second long métrage tourné dans à Djerba. « La saison des hommes », qui retrace les sacrifices des femmes djerbiennes solitaires ainsi que l'impact du retour des maris à l'île. Après une longue absence, la famille se regroupe et le couple reprend finalement sa vie conjugale. Durant ce film la réalisatrice souligne les souffrances de ces femmes en focalisant l'objectif de sa caméra sur contrastes vécus dans une société insulaire et conservatrice. Toutefois, la rencontre chaleureuse de ce couple en manque ne va pas durer longtemps suite à des moments de tensions et de déceptions.

<sup>52</sup> Nous sommes en train de collecter des données et d'étudier un corpus des chansons populaires exprimant le statut social et l'état psychologique des couples éloignés.

arbre ordinaire, mais plutôt un lieu de rencontre, d'échange et de sociabilité. C'est un arbre mythique chargé de bénédiction et source de richesse pour ces femmes laborieuses et hautement responsables. Sous son ombre interminable, elles venaient nombreuses pour se rencontrer, se distraire, vendre leurs œufs, gagner de l'argent et reprendre l'espoir d'une vie meilleure et un avenir radieux. Par conséquent, elles ont cru en sa bénédiction et ont continué à se donner rendez-vous dans son ombre et sous ses rameaux verts qui se balancent sous l'effet d'une légère brise maritime et dansent sous un ciel au bleu incomparable.

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## **Analyzing the Impact of Confusing English Words Sounds on University Students' Correct Spelling** (An applied study in Gezira, Sennar, White Nile States)

**Dr. Ali Fadlalla Ahmad AL Basheer<sup>53</sup>,**

Assistant professor, English Language Department, Faculty of Arts,  
White Nile University, Kosti, Sudan.

### **Abstract:**

*This paper aimed to analyze the effect of confusing sounds of English words on students' spelling words correctly" A students' diagnostic test was designed and subdivided into three main cores (short vowels, long vowels and diphthongs. The diagnostic test represented a tool to collect data. The data was analyzed by adopting (SPSS) program. The results revealed the following: Sudanese university students confused English sounds. Sudanese university students write down words with accordance to what they hear not according to spelling rules. The most areas of challenges are the long vowel sounds. The researcher recommended that: Teachers and tutors need to draw students' attention to spelling rules, suitable lessons plans and homework tasks should be designed, and immense efforts have to be made to apply spelling rules.*

**Key words:** Analyzing, confusing, spelling, pronunciation, phonemes, graphemes, phonetics.

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<sup>53</sup> [alifadul848@gmail.com](mailto:alifadul848@gmail.com)

## **Introduction**

Although English language in general and teaching it in particular have been taking place for many years in universities, surprisingly, it is observed that university students are still facing real problems in the area of writing skills, to be more precise, in the concern of spelling rules and techniques. Some students do not gain spelling success. The reasons why university students do not mastering pronunciation and phonetics learning techniques were pointed out by Sárosdy J. et al (2006: 78) “ Most English teachers make students study grammar and vocabulary, practice functional dialogues but they make little attempt to teach pronunciation in any overt way”. Therefore, concentration on investigating and analyzing the difficulties that face learners in such areas is highly needed. It is so difficult for learners, specially beginners, to observe that the long vowel /i:/ has different spelling graphemes that represent it, take for example, these words (see - sea - niece - perceive - people) although the sound is always long vowel /i:/ but the spelling is different in each word, it is double ee in see, ea in sea, ie in niece, ei in perceive and eo in people. University student’s weakness in writing correct spelling words drew the researcher’s attention to investigate in this important grammatical area, carrying in his mind the difficulties that encounter learners to write spelling words accurately. It is observed that when learners write words the way they sound they end up with bad and strange spellings, not only this, but also they fail to read the words they have written because they look like unreal words.

## **Statement of the problem**

This paperwork, under the title “Analyzing the effect of confusing English words sounds on university students' correct spelling" investigates the challenges that face university students in writing spelling correctly, focusing on short vowels, long vowels and diphthongs which are expected to be the most areas where university students encounter to spell English words correctly.

## **Questions of the study**

1. To what extents do university learners able to spell English vowel words correctly?

2. What areas of English vowel sounds do learners encounter most difficulties?
3. What are the main reasons behind learners' weakness in spelling techniques?

### **Importance of the study**

*This study is important because it is expected to help university students to overcome the difficulties that encounter them to master English spelling rules, as well as it is significant for professors to select the best strategies and approaches of teaching English phonetics and pronunciation. Above all this, the results of this paper are expected to solve the problem of confusing English vowel sounds.*

### **The aims of the study**

1. To expand students' knowledge about the ability to spell words.
2. To acquire various ways of having proficiency of spelling techniques.
3. To focus on areas where students need to write words accurately.
4. To help students to refresh their spelling skills and rules.

### **Hypothesis of the study**

1. Some learners are disable to spell English vowel sounds words correctly.
2. Long and short vowels in English are the most difficulties that face learners.
3. Some learners write words according to their sounds not to spelling rules.

### **Methodology of the study**

*The researcher conducted a descriptive analytical approach. A diagnostic test was designed as a tool to collect data from learners. Learner's performance of the designed test was being analyzed statistically through (SPSS) Statistical Package for Social Sciences.*

### **Population and sample of the study**

*The total population of this study are students of three Sudanese universities, Gezira University, Sennar University and White Nile University. A sample of eighty male and female students had been chosen to sit a diagnostic test, which consists of three cores, they are the short vowels core, the long vowels core and the diphthongs core with fifteen different English sounds, each core represents five sounds respectively. All the activities concerning the diagnostic test as a tool to collect data from the learners took place during the academic year 2023.*



## **Validity and Reliability of the research**

Nunan (2001) pointed out "Reliability refers to the ability of the instrument to give the same result on repeated application of the same subjects". Based on this concept, student's diagnostic test was given to five experts who are university professors. They gave suggestions and opinions on content, structure and design of the diagnostic test, their opinions, views and recommendations were confidential and highly respected and applied. They recommended that the diagnostic test is expected to give nearly the same result whenever it is given twice to the same subject, and it will measure the objective it is constructed for. To measure the reliability of the diagnostic test, the researchers used the (SPSS) statistical packages for social sciences, coefficient of consistency in respect to Cronbach's alpha.

### **Definitions:**

1. **Spelling:** Learning Express, LLC (2006:1) "Spelling is the vehicle that carries the thoughts in your mind to paper. Therefore, if you want to communicate your thoughts on paper for others to read, you need to spell correctly.
2. **Phonetics:** Philip C. (2008) pointed out "The study of human speech sounds often subdivided into articulatory phonetics (the study of how human speech sounds are made) and acoustic phonetics (the study of the acoustic properties of those sounds). There is no universal consensus on the distinction and relation between phonetics and phonology".
3. **Phonetics (n.):** Crystal D. (2008:361) stated "The science which studies the characteristics of human sound making, especially those sounds used in speech, and provides methods for their description, classification and transcription. Three branches of the subject are generally recognized: (a) articulatory phonetics is the study of the way speech sounds are made ('articulated') by the vocal organs; (b) acoustic phonetics studies the physical properties of speech sound, as transmitted between mouth and ear; (c) auditory phonetics studies the perceptual response to speech sounds, as mediated by ear, auditory nerve and brain".

4. **Phone (n.):** Crystal D. (2008:361) "a term used in phonetics to refer to the smallest perceptible discrete segment of sound in a stream of speech (phonic continuum or phonic substance). From the viewpoint of segmental phonology, phones are the physical realization of phonemes; phonic varieties of a phoneme are referred to as allophones". Teschner R. V. and Evans E. E. (2007: 19) pointed out that "A phone is the actual sound itself"
5. **Phoneme (n.):** Crystal D. (2008:361) defined the term phoneme as "The minimal unit in the sound system of a language, according to traditional phonological theories. The original motivation for the concept stemmed from the concern to establish patterns of organization within the indefinitely large range of sounds heard in languages". Whereas Teschner R. V. and Evans E. E. (2007: 19) pointed out "a phoneme is an abstract unit of sound that serves to distinguish meaning."

### **Literature Review:**

#### **The Rule-Governed Nature of Language**

Linguists agree that language should be used scientifically, it is not like a basket full of words and people just need to stretch their hands and to take words randomly from this basket, when they need to speak or write, in fact, treatment of languages has its special system and rules, we have to carry in minds the three main cores of using language: naturalness, accuracy and fluency. To make this concept more clearly, Brinton L. J. (2000:6) explained, "Language consists of signs occurring not in a random collection, but in a system. A system consists of smaller units, which stand in relation to each other and perform particular functions. These smaller units are organized on certain principles, or rules. For this reason, language is said to be rule-governed".

#### **English spelling**

Based on a long period of teaching experience, the researcher observed that, generally university students end up with frustration as soon as they come across spelling words that have vowel sounds, the main reason is expected to be the inconsistency between English sounds and English phonemes, they discover that



the sounds they hear are not exactly the signs and drawings they made on their papers. Brinton L. J. (2000:18) Explained that “Writing is often an imperfect means of representing speech is perhaps most obvious in the well-known inadequacies of English spelling. If we compare the actual sounds of English with the orthography, the graphic symbols or letters used in writing, we find the following discrepancies: One sound can be represented by a variety of letters, as with the vowel sound in meat, meet, city, key, ceiling, people, niece, one letter can represent a variety of sounds, as with d in damage, educate, picked; a letter or letters may represent no sound at all, as in knee, lamb, receipt, right, honor, rhyme. two or more letters may represent a single sound, as in throne, chain, edge, a single letter may represent two or more sounds, as in box (x=ks).”

### **English graphemes and phonemes:**

The number of letters in any language is not necessary be the same as the number of the sounds in the same language, in English language the sounds are more than forty, whereas letters are only twenty six. This concept is proved by McGuffey's (2003:3) who pointed out “ The English Alphabet consists of twenty-six letters: a, b, c, d, e,f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z. Letters are divided into Vowels and Consonants.. When only one of the vowels is sounded, the diphthong is called improper, because then, as one of the vowels is silent, it is not properly a diphthong, though it takes that name; as, oa in boat, ui in suit, where a and i are silent.”

### **Sound system and spelling system**

Some learners find it very confused to differentiate between the three different sounds of the letter (d) in these words: understand, finished and started. Those who are specialized in phonetics and phonology know well that the letter (d) sounds /d / in understand, /t / in finished and /id / in started. This is why some students write the spelling of the word (finished) like this: [fɪnɪʃt] of course it is incorrect but learners write the sound they hear. Teschner R. V. and Evans E. E. (2007: 19) explained “When several phones—such as [ t t t̄ D]—do not change the meaning of a word when they are substituted for one another, we say that these sounds constitute allophones of the same phoneme. So [th t t̄ D] are all



phones of the phoneme /t/. In most of the world's written languages, the relationship between the sound system (phonology) and the spelling system (orthography) is not a perfect one.''

### **Phonemes and graphemes inconsistency**

Teschner R. V. and Evans E. E. ( 2007: 20) pointed out that “ If a written language enjoys perfect orthographic fit, then each individual phoneme is spelled with just one grapheme (letter of the alphabet), and, conversely, each individual grapheme represents just one phoneme. Perfect fit means a one-to-one relationship: for each grapheme, just one phoneme, and for each phoneme, just one grapheme. English orthography's fit is not especially good. To a great extent that is because most varieties of English have twelve vowel phonemes but the English alphabet contains only five vowel graphemes.

### **The areas of pronunciation**

In some countries where English language is considered foreign or second language, learners often encounter challenges in the concern of the area of pronunciation. One of the reasons is that old school disciplinarians do not focus on the determination of such areas. Sárosdy J.etal (2006: 79) stated ” There are four major areas of pronunciation: the area of individual sounds, that of word stress, intonation and connected speech. If intelligibility is the goal of teaching pronunciation, speakers are to get their message across. For example, [q] and [p] may not cause a lack of intelligibility if they are confused, so mixing the words 'free' and 'three' can lead to misunderstanding. Stressing words and phrases correctly is vital if emphasis is to be given to the important parts of messages and if words are to be understood correctly.”

### **Vowel combinations, Challenges of C, and G**

In English language, there are some letters, which have more than one sound, and sometimes the sound itself is changed because of the existence of another grapheme. Here are some examples from Learning Express, LLC. (2006:20) “The letters c and g can sound either soft or hard. When c is soft, it sounds like s; when it is hard, it sounds like k. When g is soft, it sounds like j; when it is hard,

it sounds like g as in guess. Vowel combinations, as well, represent another challenge, when two vowels are together, the first one is usually long, or says its own name, and the second one is silent. For example, in the word reach, you hear long e, but not the short a. Similarly, if you know how to pronounce the word caffeine, you stand a chance at spelling it correctly because you hear that the e sound comes first. If you know what sound you hear, that sound is likely to be the first of two vowels working together.

### **Silent and doubling consonants**

Learning Express, LLC. (2006:18-19) “Many English words include silent consonants, ones that are written but not pronounced, for examples: answer, rhetorical, knight, and write. Unfortunately, there is no rule governing silent consonants; you simply have to learn the words by sight. On page 20 “Most of the time, a final consonant is doubled when you add an ending. For example, drop becomes dropping, mop becomes mopping, stab becomes stabbing. But what about look/looking, rest/resting, counsel/counseled? There are two sets of rules: one for when you are adding an ending that begins with a vowel (such as -ed, -ing, -ance,-ence,-ant) and another set for when the ending begins with a consonant (such as -ness or -ly).

### **Studying strategies for spelling improvement**

Generally, university learners have little ability to organize their study skills, some of them even do not put any plan to improve his level in any branch of his studies, and sometimes repetition of a specific habit can do well. Sárosdy J. etal (2006: 356-357) “Repetition strategies are required to study words for spelling test, or learn multiplication facts that are used daily in the classroom. Lack of organization is common among students with poor study skills. Learning Express, LLC. (2006:15-16) listed some tips for studying spelling: Use your eyes. Look at words carefully, with a marker or pen, highlight the part of the word that is hard to remember. Visualize the word with your eyes closed. Use your ears. Listen for the sound of words you hear in conversation or on the radio or television. Listen to the sound of the spelling of words. Ask someone to dictate the words and their spelling, and listen as the word is spelled out.”



### **When to teach pronunciation?**

*To determine what time to teach a particular educational situation is not an easy process because many factors should be in the instructor’s mind. One of these factors is that to what extent students are ready to respond to such lessons. Tutors have to make a decision when to comprise pronunciation teaching into lesson arrangements. It may impose students to be boring if teachers designate the whole lesson activities to pronunciation. If the teacher coerces students to listen to a longer piece of listening, this may again result in boring and frustration, particularly if they are beginners. Any way it depends on a combination of activities as well as on teachers’ mastering of both rules and strategies of teaching pronunciation in general and spelling strategies in particular.*

**Table No. 1: Individual students’ performance according to the cores.**

Student’s No.	Short Vowel	Long Vowel	Diphthong	Total
1	3	5	5	13
2	4	3	4	11
3	2	3	4	9
4	2	2	4	8
5	3	2	3	8
6	2	2	4	8
7	3	3	3	9
8	2	2	4	8
9	2	2	4	8
10	3	1	4	8
11	5	3	5	13
12	3	2	3	8
13	4	1	4	9
14	3	2	4	9
15	3	1	4	8
16	4	2	4	10
17	4	4	5	13
18	3	4	4	11
19	4	2	4	10
20	4	3	4	11
21	3	2	4	9
22	3	1	5	9
23	4	2	4	10
24	3	1	4	8
25	3	3	5	11
26	2	2	4	8



27	1	2	5	8
28	5	5	5	15
29	3	3	4	10
30	2	2	4	8
31	1	2	4	7
32	2	2	3	7
33	3	2	2	7
34	2	2	3	7
35	1	2	2	5
36	2	1	2	5
37	2	1	3	6
38	3	1	3	7
39	3	1	1	5
40	2	1	2	5
41	2	1	3	6
42	1	2	2	5
43	0	1	4	5
44	0	2	3	5
45	0	2	3	5
46	3	0	3	6
47	2	1	3	6
48	2	1	2	5
49	2	1	2	5
50	2	2	2	6
51	2	2	3	7
52	3	0	2	5
53	2	1	3	6
54	3	1	1	5
55	2	1	2	5
56	1	1	3	5
57	2	1	2	5
58	2	1	3	6
59	3	1	1	5
60	1	2	2	5
61	2	1	1	4
62	1	1	2	4
63	2	0	2	4
64	2	0	2	4
65	2	1	1	4
66	3	1	0	4
67	1	1	2	4
68	2	1	1	4
69	2	0	2	4
70	0	1	2	3
71	2	0	1	3
72	1	1	1	3
73	2	0	1	3
74	1	1	1	3
75	1	0	2	3
76	2	0	1	3

77	1	1	1	3
78	0	1	2	3
79	2	1	0	3
80	1	1	1	3
Marks obtained	178/400	124/400	224/400	526/1200
Students Passed / percentage	30/37%	11/14%	45/56%	30/37%
Students Failed / percentage	50/63%	69/86%	35/44%	50/63%

**Table No. 2: Number of students passed or failed on the bases of cores.**

Number of students	Short Vowel		Long Vowel		Diphthong		Total	
	Pass	failure	Pass	Failure	Pass	Failure	Pass	Failure
Degree								
Total =80	30	50	11	69	45	35	30	50
Percentage	37%	63%	14%	86%	56%	44%	37%	63%

**Table No. 3: Short vowels mean and standard deviation**

Number of students	Mean	Standard Deviation	Minimum Marks	Maximum Marks
80	2.2250	1.10207	.00	5.00
80	2.2250	1.10207	.00	5.00

**Table No. 4: long vowels mean and standard deviation**

Number of students	Mean	Std. Deviation	Minimum	Maximum
80	1.5500	1.05423	.00	5.00
80	1.5500	1.05423	.00	5.00

**Table No. 5: Diphthongs vowels mean and standard deviation**

Number of students	Mean	Std. Deviation	Minimum	Maximum
80	2.8000	1.32550	.00	5.00
80	2.8000	1.32550	.00	5.00

**Data analysis: source: Tables 1,2,3, and 4 above**

1. (50) of the students, represent 63% of the sample failed to write the correct spelling of words that contain short vowels. The rest of the students (30) represent (37%) face no difficulty in writing words that have short vowel sounds.
2. (69) of the students, represent (86%) of the sample failed to write the correct spelling of words that contain long vowels. The rest of the students (11) represent (14%) face no difficulty in writing words that have long vowel sounds.

3. (35) of the students, represent (44%) of the sample failed to write the correct spelling of words that contain diphthongs. The rest of the students (45) represent (56%) face no challenge in writing words that have diphthong sounds.

4. As far as students' performance is concerned, particularly in obtaining marks, they collected only ( 178 ) out of (400) marks when they dealt with short vowel sounds, (124) out of (400) marks concerning long vowel sounds- it is the least in the three cores-, and (224) out of (400) marks concerning diphthongs, it is the best in the three cores.

### **Hypotheses Discussion**

**Hypothesis (1):** "Some learners are disable to spell English vowel sounds words correctly". It is clear in table number one that students obtained only (526) marks out of (1200) marks which represents 43.8 % of the total marks in the three cores, short, long vowels and diphthongs. These percentages stand as evidence that learners are disable to spell English vowel sounds words correctly

**Hypothesis (2):** "Long and short vowels in English are the most difficulties that face learners" Tables (2) and (3) show that (50) students represent 63% of the sample with 2.2 as the mean and 1.1 as the standard deviation, failed to write words contain of short vowel sounds. In tables (2) and (4) (69) students represent 86% of the sample with 1.5 as the mean and 1.05 as the standard deviation, students failed to write words contain of long vowel sounds. These percentages stand as evidence that learners are disable to spell English short and long vowel sounds words correctly.

**Hypothesis (3):** "Some learners write words according to their sounds not to spelling rules". As the researcher went on marking the students test, he observed that most of the students made mistakes because they write English words in accordance with their sounds, they write blindly and giving no attention to spelling rules, here are some examples taken from students' answer paper: [fo**t** for foot] [so**w** for saw] [te**e** for tea] [no**z** for nose] [fi**f** for five]

### **Conclusion**

The focus of this study is that it tackles a very important issue, specifically analyzing the impact of confusing English words sounds on university students' correct spelling". The main finding are as follows: Sudanese university students



confused English words sounds. Sudanese university students write down words with accordance to what they hear. The most areas of challenges are the long vowel sounds, surprisingly; the least difficulties are the diphthongs. The researcher recommend that: Teachers and tutors need to enforce student's skills in spelling techniques, suitable lessons plans and homework tasks should be designed, and immense efforts have to be imposed to introduce spelling rules.

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An opinion piece titled:  
***The Role of Electronic Authentication in Enhancing  
Electronic Services - Sultanate of Oman***

***a. Jaber Hamood Hamdoon AL-Naumani*** –

*Ph.D. Researcher at University of Tunis Higher Institute of management*

***b. Professor Supervisor: Latifa Ben Arfa Rabai-***

*Professor at the Higher Institute of Management at the University of Tunis*

***Abstract:***

*It focuses on analyzing the opportunities and challenges that this system may face in various fields such as financial transactions, electronic legal authentication, verification of academic, medical, governmental, and other commercial information. The thesis begins by providing an overview of electronic transformation and how it enhances the electronic authentication system, particularly with the introduction of blockchain technology and its operation. It explains how blockchain technology can be used in electronic authentication and explores the advantages it can provide in improving the security and speed of electronic authentication. The thesis also presents some recommendations for developing the electronic authentication system using blockchain technology, such as improving compliance with various laws and regulations, enhancing security and privacy, and streamlining processes. In summary, the thesis focuses on studying the electronic authentication system using blockchain technology, analyzing the opportunities and challenges it faces in various fields, and providing recommendations for its development. It presents a promising future for specialists in the field of electronic documentation and can contribute to improving this field and enhancing the use of modern technologies in daily life. Ultimately, the thesis concludes that block chain technology can achieve significant progress in the field of electronic authentication.*

***Keywords:*** *Electronic authentication, Electronic services.*

## **The PhD. Thesis Discusses the Electronic Authentication System And Its Evolution With The Use Of Block chain Technology.**

### **Introduction :**

*Our world today is characterized by numerous fundamental transformations that extend beyond the international system and the balance of power, reaching into practical, technological environments, and the capacity for research and development. It is inherently obvious that all these immense transformations, whatever their form, are based on knowledge and practical accumulation as the solid foundation for social, economic, and service progress. Consequently, legislative roles were necessary to regulate legal relationships between individuals and entities providing electronic services in the path of digital transformation. Legal experts were prompted to study various legal issues related to information technology, giving rise to what is known as electronic services, including electronic authentication services.*

*Governments worldwide have turned to digitizing administrative processes to keep pace with rapid advancements, aiming to accomplish numerous transactions through electronic authentication services over the internet. This necessitates the development of secure environments and robust protection in the form of new programs and applications capable of safeguarding data and information exchanged between parties to confirm their validity. Transactions between parties, whether giver or receiver, require electronic authentication certificates to be completed securely and comprehensively.*

*Because digital transformation is a necessity for all governmental and private institutions that understand the importance of continuous improvement and development of their administrative functions and services they provide, it's essential to realize that digital transformation entails more than just implementing technology within the institution. It's a comprehensive program that affects the organization from internal working methods to how services are delivered to beneficiaries and targets, aiming to facilitate and expedite service completion in an easier and faster manner.*



Block chain technology emerged initially as a supportive technology for encryption, representing a revolutionary advancement in the world of technology and encryption. It has gained increasing popularity due to its ability to achieve transparency and security in electronic verification processes, contributing to enhancing the trust of users, companies, and governmental entities alike.

What distinguishes block chain technology is that it is a distributed database based on a chronological chain of blocks, where stored information cannot be modified or deleted after registration. Blocks are secured using encryption techniques and distributed across a network of independent computer devices, making them securely protected from manipulation and breaches. This technology represents an innovative mindset shift, as electronic authentication is considered the technical solution that enables internet users to exchange information safely and privately through the use of electronic identity, mobile phones, Universal Serial Bus (USB) tokens, which are data and communication carriers with plug-and-play capabilities, and also through text messages (SMS). Therefore, in our discussion, we will shed light on the role of electronic authentication in enhancing electronic services in the Sultanate of Oman.

### **The cognitive framework**

Electronic authentication in governmental institutions is a secure technical means to verify the authenticity of a signature or document by verifying its attribution to a specific individual, through an impartial entity known as an electronic authentication service provider or digital authentication (Prabakaran, D., 2022, p. 70).

Electronic authentication aims to provide secure techniques for documenting information, which is electronically authenticated and verifies the identity of users for authentication. All transactions are electronically signed, with identity verification on websites through electronic authentication using a digital identity service or through activated mobile phone SIM cards (Jain, A. K., Flynn, P., & Ross, A. A., 2011).

*It is considered one of the primary initiatives to achieve e-government objectives, as it establishes the fundamental framework for governmental entities to provide electronic services. This facilitates government efficiency and streamlines transactions for citizens and providers. Additionally, it contributes to enhancing the security and credibility of electronic transactions. Electronic authentication serves as the technical and legal solution that enables internet users to exchange information securely and confidentially using electronic identity and mobile phones (Dai, C., 2022, p. 127).*

*Therefore, e-government utilizes information and communication technology to develop, enhance, and manage public affairs. This is manifested in the provision of official government services, whether between governmental entities or with the public, through an informatics approach that relies on the internet and its technologies. This is done while ensuring specific security guarantees to protect both the beneficiary and the service provider (Serra, L. C., 2015, p. 67).*

### ***Electronic authentication and methods of providing electronic services***

*The electronic authentication project in the Sultanate provides several essential services, including:*

- 1. Identity Verification: The traditional method of identity verification on websites involves entering a username and password, but this technique may be susceptible to hacking and unauthorized use. However, electronic authentication involves using another method that requires verification of electronic identity and identity on mobile phones or through a code.*
- 2. Electronic Signature: Any citizen can use this feature to electronically sign any certificate at any time. Users can sign using electronic identity, mobile phones, or a code.*
- 3. Encryption: This process encrypts information so that only authorized parties can read the data. The electronic authentication center has activated this service to safeguard information.*
- 4. Email Encryption: Files can be sent securely via email using a Universal Serial Bus (USB) code.*



5. 5. Email Signing: Another method to ensure the confidentiality of data sent via email, accessible through a Universal Serial Bus (USB) code.

*The National Electronic Authentication Center in the Sultanate of Oman is a comprehensive system for managing the infrastructure of the public key infrastructure (PKI), which constitutes an integrated security system for managing digital keys used to maintain the confidentiality of information, verify the identity of users, and ensure the integrity of data against tampering and alteration, as well as for performing digital signatures. These features underpin all electronic transactions, such as e-government services, e-commerce, and other web-based applications. This security framework enables users across various categories to conduct electronic transactions securely, reliably, and safely over the Internet. Furthermore, the role of the Information Technology in the Ministry of Transport and Communications and Information Technology is pivotal, serving as the primary center responsible for formulating and implementing the strategies of e-government in the Sultanate of Oman. Its primary importance lies in facilitating and leading the implementation of government electronic services, thereby enhancing the efficiency of the public sector through the utilization of modern technology and fostering a digitally reliant society. The ministry's responsibilities include building a digitally literate human resource base to successfully implement and adopt government electronic services, with the aim of increasing citizen involvement in utilizing these digital services. Moreover, it assists other ministries and governmental entities in successfully implementing their IT-based projects (SONY. Suppor, 2022).*

### **Key initiatives of electronic authentication include**

1. *Providing authentication services in accordance with the policies, requirements, and agreements of the Information Technology Authority.*
2. *Facilitating participation in the electronic authentication initiative as either an electronic authentication service provider or a user registration entity.*
3. *Securing communication between servers and clients (Heidari, H, 2022, 191).*



4. *The Information Technology Authority in the Sultanate of Oman relies on digital encryption, which involves the process of preserving the confidentiality of both static and dynamic information using software capable of transforming and translating that information into codes. Thus, if accessed by unauthorized individuals, they would not be able to understand anything because what appears to them is a mixture of unintelligible symbols, numbers, and letters (hahzad, F. X, 2020, 62).*
5. *Electronic signature is considered a document placed on an electronic editor and takes the form of letters, numbers, symbols, or others, with a unique characteristic that allows identifying the signatory and distinguishing them from others (Babu, E. S, 2022).*

### **Types of Encryption Technology**

1. *Symmetric Encryption: In this type of encryption, both the sender and the receiver use the same private key that has been set up by the contractual parties to encrypt the message, converting it into codes and unintelligible signals. The decryption is then performed using the same private key that was used for encryption (Abdelghaffar, H.2012, 2).*
2. *Asymmetric Encryption: This system relies on two keys, a private key and a public key. The public key is stored on public electronic platforms to allow access by the public, while the private key remains under the control of a single entity, typically the sender. It is the responsibility of the sender to ensure the safety conditions to protect the key from misuse by others (Blog, I, 2021).*

***The concept of digital identity refers to the essence of an entity, thing, or subject. When considering methods of identifying identity, it can be through the following***

1. *Individual identifiers: Such as belonging to a specific nationality, being a product of a particular company, or any form of information that distinguishes it.*
2. *Unique identifiers: Such as the serial number on a product.*

3. *Secure identifiers: Such as a passport or a smart meter.*

### **Technological options for biometric measurements in e-government applications**

*There are several biometric measurement technologies available for e-government applications, each with its own strengths and limitations. The choice of technology depends on factors such as the required level of security, system requirements, and user convenience. Common biometric measurement methods include fingerprint recognition, iris recognition, facial recognition, voice recognition, and multimodal biometrics. Each method has unique characteristics and applicability, enabling governments to choose the most suitable options for their e-government needs.*

*Biometric authentication within e-government relies on collecting, storing, and managing sensitive biometric data. Ensuring data security and privacy is crucial to maintaining public trust and preventing unauthorized access or misuse of personal information. Governments must adhere to strong security protocols, encryption standards, and access controls to protect biometric databases. Compliance with relevant data protection laws and regulations, such as the General Data Protection Regulation (GDPR), is essential to safeguarding user privacy rights and ensuring legal compliance. **This involves:***

- *Encryption: Biometric data should be encrypted during transmission and storage using encryption algorithms such as Advanced Encryption Standard (AES) to protect data from interception or unauthorized access.*
- *Secure storage: Biometric data should be securely stored in a dedicated and well-protected database. Access controls should be implemented to restrict access to authorized employees only. The database should have multiple security layers, including firewalls, intrusion detection systems, and monitoring mechanisms to detect and prevent unauthorized access or breaches.*
- *Access control: Strict access control mechanisms should be implemented to limit access to biometric data. Permissions should be granted only to*



individuals with a legitimate need to access the data, and role-based access control (RBAC) can be implemented to ensure individuals have access rights appropriate to their roles and responsibilities

- *Protection of biometric templates: Biometric templates derived from raw biometric data should be securely stored and protected. The templates should be irreversible and non-reversible to prevent reconstruction of the original biometric data. Techniques such as one-way hashing or encrypted transformation can be used to protect biometric templates from reverse engineering*
- *Data minimization: Governments should adopt a principle of minimizing data to the minimum necessary, collecting and storing only the necessary biometric data required for authentication purposes. Unnecessary data should be disposed of to reduce the risk of data breaches and unauthorized access.*
- *Secure transmission: When transmitting biometric data between different components of the e-government system, secure communication protocols such as Transport Layer Security (TLS) should be used to ensure data confidentiality and integrity, preventing eavesdropping or tampering during data transmission.*
- *Identity concealment and pseudonymization: To protect individual privacy, biometric data should be anonymized or pseudonymized wherever possible, removing any identifiable information to make the data unlikable to individuals. The use of pseudonyms replaces identifiable information with pseudonyms, allowing the data to be used for specific purposes while preventing direct identification.*
- *Compliance with data protection regulations: Governments must comply with relevant data protection regulations, such as the General Data Protection Regulation (GDPR) or local privacy laws. Compliance involves obtaining informed consent from individuals, providing transparency in data processing practices, notifying individuals in case of data breaches, and respecting individuals' rights regarding their biometric data.*



- *Regular auditing and monitoring: Regular auditing and monitoring of the biometric authentication system should be conducted to detect and address security vulnerabilities or potential data breaches. Records should be retained to track system activities and identify any suspicious or unauthorized access attempts.*
- *User awareness and education: Governments should invest in user awareness and education programs to inform individuals about security procedures, their rights regarding their biometric data, and the steps taken to protect their privacy. Educating users about the benefits and risks associated with biometric authentication helps build trust and ensure responsible use of biometric data.*

### ***Technologies used in biometric authentication***

*Multi-modal biometric measurements combine two or more biometric measurement methods to enhance the accuracy and reliability of identity verification. By integrating multiple biometric features such as fingerprints, iris patterns, facial features, and One-Time Passwords (OTP), governments can create more robust and secure e-government systems. Multi-modal biometrics can alleviate the limitations of individual methods, improve accuracy, and provide greater resistance to impersonation attempts.*

### ***The benefits of electronic authentication based on the new system include***

- *Speed and efficiency: Electronic authentication enables faster and more efficient transaction completion, saving time and effort for individuals and organizations.*
- *Security and protection: Electronic authentication provides a high level of security and protection for transmitted and received documents and data, reducing opportunities for forgery and fraud.*
- *Cost-effectiveness: The cost of transactions can be reduced using electronic authentication compared to traditional paper-based signatures, which require printing, shipping, and distribution costs.*

- *Accessibility and convenience: Electronic authentication can be used anywhere and anytime, providing more opportunities for users to easily conduct transactions.*
- *Environmentally friendly: Electronic authentication reduces paper usage and saves time and effort in transactions.*
- *Interactivity and collaboration: Electronic authentication enables individuals and organizations to interact and collaborate more easily and effectively, facilitating seamless communication and interaction.*
- *Ease of use: Electronic authentication provides a user-friendly interface, making the signing and authentication process much easier, thereby increasing participation and usage.*
- *Consistency: High consistency in the signing and authentication process can be ensured using electronic authentication, improving process quality and reliability.*
- *Tracking: Electronic authentication allows for accurate tracking of transaction execution, enabling direct and effective monitoring of transaction stages. Electronic authentication between individuals and organizations facilitates access to government and private services with ease, making daily life easier and contributing to improving work quality.*
- *Diversity: Electronic authentication can be used for signing and authenticating various types of transactions, such as contracts, agreements, official, and electronic documents.*
- *Record keeping: Accurate records of transactions conducted using electronic authentication can be retained, providing important documents for users and organizations in the future*
- *Responding to global challenges: Electronic authentication enables overcoming geographical boundaries and helps address global challenges, such as pandemics, economic repercussions, and environmental issues.*
- *Scalability: Electronic authentication allows for expansion in areas of work and commerce globally, enhancing economic growth and sustainable development*



- *Procedure reduction: Electronic authentication can reduce administrative and regulatory procedures associated with paper-based signatures, thereby improving efficiency and productivity and saving time and resources.*

## **Conclusion**

*The implementation of multi-level electronic authentication serves as a model linked to a system used to enhance the security of electronic accounts and applications by providing additional layers of verification for users. This system includes multiple levels of verification, conducted through various methods such as passwords, authentication codes, facial recognition, fingerprinting, iris scanning, and others. When using multi-level authentication, the user must input their credentials, such as a password, and then confirm their identity using an additional authentication method, such as an authentication code sent to their mobile phone. This increases the difficulty of breaching accounts, avoiding fraud, and electronic intrusion.*

*Multi-level authentication is typically used in the execution of activities on government websites, banking institutions, e-commerce websites, and large companies that contain sensitive information. It can also be used to protect mobile devices, personal computers, and critical servers from intrusion. In general, multi-level authentication helps increase electronic security for users and reduce the chances of intrusion and fraud.*

*The implementation of multi-level authentication builds trust between users and the institutions they deal with, leading to an improved user experience and maintaining the good reputation of companies and organizations. It should be noted that multi-level authentication is considered a qualitative addition to basic methods of protecting electronic accounts. Although the use of multi-level authentication enhances electronic security, it should be used alongside other cyber security measures, such as regularly updating software and applications and avoiding the use of weak passwords.*



Additionally, users should follow some safe practices when using this application, such as not sharing authentication codes with anyone else and not using the same authentication code for multiple accounts. Instant notifications should also be activated to receive alerts in case of attempted account breaches. The various multi-factor authentication methods used in the application include:

- *Temporary authentication codes: A temporary code is generated and sent to the user's mobile phone or email, and this code is used to verify the user's identity.*
- *Voice and image recognition: Voice and image recognition technologies are used to identify the user.*
- *Fingerprint recognition: Built-in fingerprint sensors in mobile phones or tablets are used to verify the user's identity.*
- *Phone call verification: A phone call is made to the user to verify their identity.*
- *Answering security questions: Security questions are asked to the user to verify their identity. Therefore, the application represents an effective method to improve electronic security and protect sensitive accounts and data. It should be used in conjunction with other cybersecurity measures and adhering to safe practices. Multi-level authentication is a system used to enhance the security of electronic accounts and applications by providing additional layers of verification for users.*

### **Recommendations**

1. *Encourage companies and institutions to use electronic authentication utilizing block chain technology to enhance security levels and protection in electronic transactions.*
2. *Develop specialized electronic platforms to provide electronic authentication services using blockchain technology, offering a high level of security and protection for users.*

3. *Provide training and education for users and workers in various industries on how to use electronic authentication technology using block chain and its benefits.*
4. *Collaborate with governments and international organizations to develop the necessary standards and regulations to regulate the use of electronic authentication technology using block chain, ensuring compliance with local and international laws and regulations.*
5. *Raise awareness of the importance of using electronic authentication technology using block chain and its benefits for users and workers in various industries.*
6. *Incentivize banks and financial institutions to use electronic authentication technology using block chain to improve security levels and protection in electronic payment operations.*
7. *Support research and development in the field of electronic authentication technology using block chain to improve performance and efficiency and develop new applications.*
8. *Enhance collaboration between different industries, startups, and major technology companies to develop innovative solutions using electronic authentication technology using block chain.*
9. *Encourage governments and governmental institutions to use electronic authentication technology using block chain to improve security levels and protection in electronic government services.*
10. *Develop awareness and educational campaigns for users about the importance of using electronic authentication technology using block chain and identifying the risks of not using it.*



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## **Transition politique et corruption au Maroc : indicateurs et regards croisés**

**Aziza BENKADA<sup>54</sup>**

*Docteur en droit public*

*Université Mohammed Premier oujda, Maroc*

### **Résumé**

*Le Maroc a connu une période de transition, notamment en 1998, après l'arrivée du gouvernement "d'alternance" issu de l'opposition pour la première fois depuis l'indépendance. Cette arrivée a suscité des espoirs de réformes. L'arrivée d'un jeune roi a également été considérée comme un signe de transition. Dans ce contexte d'alternance, le pays a mis en place une multitude de dispositifs pour lutter contre la corruption.*

*Toutefois, la question de la corruption présente au Maroc un paradoxe intéressant. D'un côté, il y a un fort discours politique contre la corruption et une réglementation suffisante pour la contrer. De l'autre côté, il y a une résistance active de ceux qui en bénéficient, une tolérance sociale croissante et des pratiques de corruption largement visibles, mesurables et reconnues par les acteurs.*

*L'intérêt de ce sujet réside dans la compréhension des défis auxquels le Maroc fait face vers la démocratie, malgré les réformes politiques entreprises. L'étude de la question de la corruption dans le pays permet également d'analyser l'impact de ce phénomène sur la consolidation des institutions démocratiques et la confiance des citoyens envers elles.*

**Mots Clés** *Corruption – Démocratie – Développement économique – Développement social – Transition politique – Système autoritaire – Système démocratique.*

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<sup>54</sup> [azizabenkada1@gmail.com](mailto:azizabenkada1@gmail.com)

## Introduction

En faisant illustration de l'aspect terminologique, la notion de la transition politique désigne un processus de passage d'un régime autoritaire vers un système politique ouvert<sup>55</sup>. C'est une période de changement fluide ou "anémique", qui survient entre deux régimes politiques stables. La "transitologie" est un sous-champ disciplinaire qui se penche sur les processus, les acteurs et les conditions qui permettent l'instauration de dispositifs et de modalités de gouvernance qui caractérisent les démocraties pluralistes : élections libres et concurrentielles, respect des droits humains, économie de marché, primauté du droit, société civile dynamique et indépendante<sup>56</sup>.

Au Maroc, la constitution de 2011 a établi le Royaume en tant que monarchie constitutionnelle, démocratique, parlementaire et sociale. Thierry Le Roy (2009), dans ses analyses constitutionnelles du contexte marocain, souligne que : « que ce soit à des fins de politique interne, ou pour marquer l'intégration dans une communauté internationale de plus en plus friande de constitutions, on a vu les dirigeants multiplier les révisions constitutionnelles : cinq constitutions nouvelles se sont succédé au Maroc de 1962 à 1996 »<sup>57</sup>. Jusqu'en 1993, le pays a mis en place un ensemble de réformes et de concessions visant principalement à répondre aux exigences des institutions financières internationales<sup>58</sup>.

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<sup>55</sup> Khadija Mohsen-Finan, « changement de cap et transition politique au Maroc et en Tunisie ». Éditions Le Seuil. Pouvoirs 2013/2 (n° 145), 2013, P.114.

<sup>56</sup> Catherine Achin, éd., Dictionnaire. Genre et science politique : Concepts, objets, problèmes. Paris : Presses de Sciences Po, P.493.

<sup>57</sup> Thierry Le Roy, « Le constitutionnalisme : quelle réalité dans les pays du Maghreb ? », Revue française de droit constitutionnel, 79(3), 2009. P. 545

<sup>58</sup> En effet, le Maroc, comme tous les pays en voie de développement importateurs de pétrole, a subi les conséquences du premier choc pétrolier de 1973 sur son économie. Cette crise a été aggravée par l'embargo de l'OPEP en réponse à la guerre du Kippour, ce qui a entraîné une hausse considérable des prix du baril. En 1974, le pays était déjà confronté à une situation économique difficile en raison des fluctuations des prix des phosphates, ainsi que des effets néfastes de la sécheresse qui a duré de 1980 à 1984. De



La réforme constitutionnelle de 1972 a été largement rejetée par l'opposition. Les problèmes internes se sont multipliés dans le pays et la monarchie a été confrontée à des défis majeurs, tant sur le plan social que de la part de l'armée. Le roi Hassan II a donc décidé d'établir un climat de détente entre la monarchie et l'opposition afin de ne pas avoir à faire face à deux fronts, celui de l'opposition et celui de l'armée<sup>59</sup>.

Les réformes constitutionnelles de 1992 et 1996 n'ont pas modifié l'organisation des différents pouvoirs ni les équilibres entre eux, et n'ont pas cherché à établir une monarchie constitutionnelle parlementaire ou à

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plus, l'économie marocaine était fortement dépendante de l'agriculture, ce qui la rendait vulnérable aux aléas climatiques. Face à ces crises économiques profondes, le Maroc a adopté les mesures du programme d'ajustement structurel proposé par la Banque mondiale et le FMI en 1981 afin de réduire les dépenses publiques et de surmonter les difficultés économiques. Cependant, l'adoption de ce programme a entraîné une hausse des prix des produits de base, ce qui a provoqué des émeutes à Casablanca en juin de la même année. La répression de ces émeutes a causé la mort d'environ une centaine de personnes. En 1983, les réserves de devises du Maroc étaient épuisées, obligeant le gouvernement à réduire les achats à l'étranger et à solliciter l'aide des institutions financières internationales. Ces mesures ont permis à l'État d'obtenir le rééchelonnement de sa dette auprès des bailleurs internationaux. Dans tous les cas, les programmes d'ajustement structurel ont entraîné des conséquences politiques et économiques désastreuses. Encore une fois, le modèle centralisé adopté depuis l'indépendance a contribué à l'aggravation de la situation économique et sociale du pays. Cette situation a ouvert la voie au consensus de Washington. Il visait principalement à réduire les interventions publiques de l'État et à promouvoir la liberté des entreprises et des forces économiques. Certaines interprétations ont assimilé ce consensus au néolibéralisme. Voir : Ángela Suarez Collado, Raquel Ojeda Garcia, « The effects of the Moroccan advanced regionalization process in Western Sahara », *Transmodernity. Special Issue : Sahara*, 5 (3), 2015. Fouad Abdelmoumni, « Le Maroc et le Printemps arabe », *Pouvoirs*, 145 (2), 2013. Jean-Pierre Berdot, « L'ajustement structurel dans les pays en développement. Une analyse de la faisabilité », *Revue économique*, (4), 1998. Jacques Fisette et Marc Raffinot, « Gouvernance et appropriation locale du développement : Au-delà des modèles importés », *Les Presses de l'Université d'Ottawa*, 2010, Available at : <https://doi.org/10.1080/02255189.2012.664547> (consulté le 21/04/2023).

<sup>59</sup> Khadija Mohsen-Finan, (2013), *op.cit.* P.106.



démocratiser le régime. Leur objectif était plutôt de rapprocher le Palais et les partis d'opposition, sans pour autant répondre à leurs revendications. Les forces de l'opposition ont souscrit moins au texte révisé en 1996 qu'au contexte politique nouveau, caractérisé par un consensus politique, considéré comme une condition importante pour une nouvelle dynamique démocratique ouverte vers la réalisation de l'alternance<sup>60</sup>.

Dans ce contexte d'alternance, le Maroc a mis en place depuis plusieurs années une multitude de dispositifs pour lutter contre la corruption. La reconnaissance de Transparency Maroc en 1997, la ratification de la convention des Nations Unies sur la lutte contre la corruption en 2003, la mise en place de l'Instance centrale de prévention de la corruption (ICPC) en 2008, sont autant d'exemples concrets.

La corruption, en tant qu'abus de pouvoir public, représente « l'une des principales menaces en matière de développement durable<sup>61</sup> ». Il est évident que la corruption est le terrain fertile de la pauvreté, car elle « entrave la croissance économique, décourage l'investissement privé étranger et réduit les ressources qui pourraient être affectées à la maintenance des infrastructures. Elle affecte la situation des pauvres en leur refusant l'accès aux services publics sans pot-de-vin. Elle contribue à l'informatisation de l'économie, réduit l'efficacité des projets financés par les bailleurs de fonds et affaiblit l'appui de l'opinion publique des pays industrialisés pour une telle assistance »<sup>62</sup>.

L'article 248 du code pénal marocain définit la corruption, comme étant le fait par « toute personne de solliciter ou agréer des offres ou promesses, sollicite ou

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<sup>60</sup> Frédéric Vairel, « La transitologie, langage du pouvoir au Maroc », Éditions De Boeck Supérieur. Politix 2007/4 (n° 80), 2007, P. 113.

<sup>61</sup> Brigitte Pereira, « Éthique, gouvernance et corruption », Revue française de gestion, vol. 186(n°6), 2008, P.54.

<sup>62</sup> Pierre Jacquemot, « Le traitement de la corruption. Le cas du Kenya », Afrique contemporaine, vol. 213(n°1), 2005, P. 165.

reçoit des dons, présents ou autres avantages pour accomplir ou s'abstenir d'accomplir un acte de sa fonction »<sup>63</sup>.

La lutte contre la corruption, dans la plupart des pays en voie de développement, prend généralement une dimension à caractère international et est comprise comme une "mode". Autrement dit, la lutte contre la corruption et la diffusion des normes de moralisation de la vie publique sont devenues, dans le contexte international, des modes qui s'inscrivent dans une logique de « mimétisme en vue d'une reconnaissance internationale, d'un accroissement de la crédibilité et de la légitimité internationale du pays »<sup>64</sup>, selon les termes de Hibou et Tozy (2009).

Depuis l'indépendance, les changements politiques superficiels ainsi que l'inefficacité des mesures nationales de lutte contre la corruption ont créé des tensions sociales et politiques. Aujourd'hui encore, le pays vit une conjoncture politique marquée par des réformes qui demeurent incertaines.

Dans cette perspective, l'objet de notre article est d'analyser la relation entre la persistance des niveaux élevés de corruption au Maroc et son impact sur la consolidation des institutions démocratiques, malgré les réformes entreprises. À cet égard, la problématique qui se pose est la suivante : « **Comment expliquer les difficultés de la transition démocratique au Maroc malgré les réformes politiques entreprises, et quel est le lien entre ces difficultés et la persistance des niveaux élevés de corruption dans le pays ?** ».

L'intérêt de ce sujet réside dans la compréhension des défis auxquels fait face le Maroc dans sa transition vers la démocratie, malgré les réformes politiques entreprises. L'étude de la question de la corruption dans le pays

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<sup>63</sup> Code pénal marocain, Version consolidée en date du 15 septembre 2011, available at : <https://www.ilo.org/dyn/natlex/docs/SERIAL/69975/69182/F1186528577/MAR-69975.pdf> (consulté le 07/02/2021).

<sup>64</sup> Béatrice Hibou, Mohamed Tozy, « La lutte contre la corruption au Maroc : vers une pluralisation des modes de gouvernement ? », *Droit et société*, vol. 72(n°2), 2009, P. 340.



permet également d'analyser l'impact de ce phénomène sur la consolidation des institutions démocratiques et la confiance des citoyens envers elles. En examinant ces questions, cet article vise à contribuer à la compréhension de la dynamique politique du Maroc et à fournir des pistes de réflexion pour améliorer les processus de transition démocratique dans le pays.

Avant de pouvoir procéder à cette analyse, il est nécessaire de commencer par une revue de la littérature pour comprendre l'impact des évolutions politiques sur la corruption au Maroc. Ensuite, une section sera dédiée pour évaluer l'efficacité des politiques de lutte contre la corruption, en fonction de certains indices et données statistiques de perception de la corruption, et procéder en fin à la discussion des résultats et aux perspectives possibles.

### **Approche méthodologique**

Dans le cadre de cette étude, la problématique de la corruption se pose en termes d'impact sur la démocratisation de la vie politique au Maroc. Ainsi, nous nous efforcerons de répondre aux interrogations suivantes, en prenant le Maroc comme cas pratique de notre étude : Quelle est l'ampleur de la corruption au Maroc ? quel est son influence sur la transition politique au Maroc ? Quels sont les principaux facteurs qui contribuent à la corruption au Maroc ? Comment les indicateurs de la corruption au Maroc ont-ils évolué depuis l'année 2018 jusqu'à l'année 2021 ? Quelles sont les mesures nécessaires susceptibles de renforcer les politiques de prévention et de lutte contre la corruption au Maroc ?

Pour répondre à ces questions, nous avons choisi d'effectuer une recherche documentaire en utilisant l'approche compréhensive et l'approche historique afin d'étudier l'évolution de la corruption au Maroc en prenant en compte les facteurs politiques, économiques et culturels qui ont contribué à son développement. Il s'agit également de remettre en question la transition démocratique au Maroc, en examinant les rapports de pouvoir et en comparant les discours avec la réalité. L'objectif principal est d'identifier les causes profondes de la corruption dans le pays.



Nous avons également opté pour l'approche normative qui s'appuie sur les données statistiques fournies principalement par l'INPPC (Instance Nationale de la Probité, de la Prévention et de la Lutte contre la Corruption<sup>65</sup>). Il s'agit de choisir les indices suivants :

- 1) **L'Indice de Perception de la Corruption (IPC)** qui mesure les niveaux perçus de corruption du secteur public dans plus de 180 pays et territoires.
- 2) **L'Indice de l'Etat de Droit (WJP)** qui mesure la performance en termes d'état de droit dans 139 pays réparties entre huit facteurs : Contraintes aux Pouvoirs du Gouvernement, Absence de Corruption, Gouvernement Ouvert, Droits Fondamentaux, Ordre et Sécurité, Application des Règlements, Justice Civile et Justice Criminelle.
- 3) **Varieties of Democracy Project (V-dem)** : la mesure de la corruption comprend cinq types distincts de corruption qui couvrent à la fois différents domaines et différents niveaux de la sphère politique, en faisant une distinction entre la corruption exécutive, législative et judiciaire. Dans le domaine du pouvoir exécutif, les mesures distinguent également la corruption principalement liée aux pots-de-vin et la corruption liée aux détournements de fonds dans 179 pays.

### **Corruption et dérives du système politique au Maroc : revue de littérature**

Tout comme de nombreux autres pays, le Maroc a connu une phase électorale de transition. Les élections de 1993, 1997 et 2002 ont été considérées comme un véritable levier pour la démocratisation du pays. Le gouvernement "d'alternance" présidé par Abderrahman El Youssoufi en 1998, issu de l'opposition pour la première fois depuis l'indépendance, a suscité de nombreux

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<sup>65</sup> L'INPPC est une institution marocaine nationale et indépendante ayant une personnalité morale et une autonomie financière et administrative. Elle a été créée en vertu de l'article 36 et la loi 46-19 fixe ses missions, ses attributions, sa composition, son organisation et ses règles de fonctionnement, conformément aux dispositions de l'article 167 de la Constitution.

espoirs de réformes. L'accession au trône de Mohammed VI en juillet 1999, jeune roi sportif surnommé "roi des pauvres" en raison de ses actions caritatives, a été un autre signe du processus de transition. Ses premiers discours ont été socialement orientés et favorables aux droits de l'homme. Il a également pris une série de mesures emblématiques dans les premiers mois de son règne. Ces actions ont contribué à crédibiliser l'image d'un roi démocrate. Le climat politique conjoncturellement modifié du royaume a incité des acteurs issus de divers horizons sociopolitiques à se saisir du thème de la transition pour promouvoir un discours sur « le Maroc en changement »<sup>66</sup>.

En matière de la corruption, feu le roi Hassan II tenait des propos selon lesquels la présence de receleurs favorise le vol et celle des corrupteurs favorise la corruption. Selon lui, la solution est de « moraliser l'action des responsables. La corruption a toujours vécu et continuera de vivre partout »<sup>67</sup>. C'est le cas également des partis politiques qui ont inclus dans leurs programmes électoraux un axe spécifique pour lutter contre la corruption.

Cependant, cette question semble être un moyen simple de se différencier les uns des autres pour attirer les votes des électeurs. Il semblerait que la volonté politique exprimée soit souvent loin des mesures concrètes mises en place. En effet, la lutte contre la corruption au Maroc présente un paradoxe intéressant. D'un côté, il y a un fort discours politique contre la corruption et une réglementation suffisante pour la contrer, mais de l'autre côté, il y a une résistance active de ceux qui en bénéficient, une tolérance sociale croissante et des pratiques de corruption largement visibles, mesurables et reconnues par les acteurs<sup>68</sup>.

Béatrice Hibou et Mohamed Tozy (2007) considèrent que le pouvoir politique a confisqué la loi au détriment des ulémas et de la communauté, ce qui

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<sup>66</sup> Frédéric Vairel, (2007), *op.cit.* P.114.

<sup>67</sup> Hassan II, *Mémoires d'un roi. Entretien avec Éric Laurent*, Plon, 1993, p. 177-178.

<sup>68</sup> Kamal El Mesbahi, « La prévention de la corruption au Maroc, entre discours et réalité », Dans *Pouvoirs*, Éditions Le Seuil, 2 (n° 145), 2013, de P. 93 à P. 95.



a entraîné la perte d'autonomie des juges et la suppression de l'accès des groupes les plus démunis aux pratiques de négociation de la norme. La loyauté envers l'instance dominante est désormais nécessaire pour obtenir des résultats favorables. Les intermédiaires agréés rétribués ont remplacé les cadis et les ulémas. La capacité à négocier est devenue fonction de la capacité de mobiliser des soutiens dans les lieux de pouvoir, et les moyens financiers sont de plus en plus opérants pour amener la norme à correspondre aux intérêts collectifs ou individuels<sup>69</sup>. C'est ainsi que le système juridique a également contribué à faire de la "corruption" un élément central de la pérennité du système politique<sup>70</sup>.

Le réalisme politique machiavélien repose sur la maxime « la fin justifie les moyens », ce qui signifie que les moyens utilisés pour atteindre un objectif sont considérés comme justifiés en fonction de la valeur de l'objectif visé<sup>71</sup>. Cette approche traditionnelle du réalisme politique inclut des normes politiques qui peuvent justifier des pratiques de corruption morale. Dans le dictionnaire des sciences politiques et sociales, cette notion est considérée comme un « amoralisme politique dommageable voire dangereux »<sup>72</sup>.

La superficialité des changements politiques ainsi que l'inefficacité des mesures nationales de lutte contre la corruption, omniprésentes depuis l'indépendance au Maroc, ont engendré des tensions sociales et politiques. Selon Fouad Abdelmoumni (2013), « la répression, la corruption, la propagande et la cooptation ont perdu de leur efficacité, elles ne suffisent plus à satisfaire ou à endiguer les attentes et les demandes sociales en forte expansion. Ainsi, c'est la conjonction de l'augmentation des attentes et de la diminution de l'efficacité des

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<sup>69</sup> Béatrice Hibou, Mohamed Tozy, « L'imaginaire juridique et politique marocain : une prise de liberté avec le droit », *Finance & Bien Commun* 2007/3 (N° 28-29), Éditions De Boeck Supérieur, 2007, P.112.

<sup>70</sup> Béatrice Hibou, Mohamed Tozy, (2007). P. 106.

<sup>71</sup> Pierre-Alexis Tchernouïvanoff, « Pour une sociologie du réalisme politique : Le cas du Parti socialiste », Thèse de doctorat en Sociologie, Université René Descartes, Paris V, 2012, P. 19.

<sup>72</sup> David Alcaud, Laurent Bouvet, *Dictionnaire des sciences politiques et sociales*, Paris : Sirey, 2010, P. 283.

*instruments de régulation et de contrôle de la société qui a conduit à l'émergence d'un mouvement contestataire le 20 février 2011, même si de nombreux autres facteurs ont contribué à son émergence et à sa configuration à ce moment précis<sup>73</sup> »*

*En effet, la crise économique de 2008 a plongé l'économie nationale dans une période difficile sur le plan financier, creusant ainsi l'écart entre la société civile et les décideurs. En 2011, le Maroc n'a pas été épargné par les mouvements de contestation populaires qui ont touché de nombreux pays du monde arabe, connus sous le nom de "Printemps arabe". Les manifestations déclenchées par le Mouvement du 20 février<sup>74</sup> ont réussi à susciter un débat public sur plusieurs sujets politiques, économiques et sociaux. Les revendications étaient principalement axées sur deux thèmes : l'arbitraire et la corruption<sup>75</sup>.*

*En réponse à ces revendications, le Roi a confirmé dans son discours du 9 mars 2011 la nécessité d'un changement "concerté" basé sur un ensemble de nouveaux principes constitutionnels, tels que la responsabilité liée à la reddition des comptes, la consolidation des attributions des institutions luttant contre la corruption dans le cadre d'une bonne gouvernance, etc.*

*Dans ce contexte où le pays est confronté à une nouvelle conjoncture politique marquée par des mobilisations sociales régulières, les réformes en cours restent encore incertaines. Depuis l'indépendance, les taux d'abstention enregistrés sont élevés, avec une tendance notable au boycott de la part des forces politiques et des différentes couches sociales. Cette tendance exprime un rejet massif envers une classe politique appartenant à un système politique encore à un stade embryonnaire de la démocratie<sup>76</sup>. C'est notamment le cas lors des dernières élections législatives de septembre 2021, où le taux d'abstention a avoisiné les 50*

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<sup>73</sup> Fouad Abdelmoumni, (2013), P. 131.

<sup>74</sup> Ibidem.

<sup>75</sup> Ibidem, p. 133.

<sup>76</sup> Mounia Bennani-Chraïbi, « De nouveaux « défenseurs du trône » ? », *Les Cahiers de l'Orient* (n°90), 2008, P. 12.



% (seulement 50,43 % de participation, selon la MAP77). Le principe de proximité, qui suppose une participation accrue des citoyens, souffre d'autant d'insuffisances, surtout dans les pays en développement, où les risques de corruption des élus locaux et l'augmentation des coûts de coordination politique et des conflits sont plus importants<sup>78</sup>.

Au niveau territorial, il est constaté que la gestion des affaires locales et territoriales dans les pays en voie de développement ne révèle pas les mêmes résultats que dans les pays développés. Les transferts financiers intergouvernementaux entre le pouvoir central et les collectivités territoriales dans les démocraties occidentales sont basés sur des critères d'efficacité, d'équité et de prestation de services de base à la population. Toutefois, dans les pays en voie de développement, ces transferts sont souvent manipulés par les pouvoirs locaux dans une logique de « réalisme politique et de laisser-aller »<sup>79</sup>, afin de maximiser leurs chances de réélection et de défendre les intérêts de leurs partisans.

Il est évident que le système de production des élites au Maroc est caractérisé par une confusion organique entre pouvoir politique et économique. Cette confusion contribue grandement à la création de ce qu'on appelle communément « richesse illégitime », d'autant plus qu'elle repose sur une politique largement clientéliste. Dans un système où la corruption, la rente, le détournement des fonds, le népotisme, le clientélisme, le favoritisme, etc., sont

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<sup>77</sup> Agence marocaine de presse (MAP), Elections législatives septembre 2021, available at : <https://www.mapnews.ma/fr/dossier/elections-g%C3%A9n%C3%A9rales-2021-r%C3%A9sultats> Code pénal marocain, Version consolidée en date du 15 septembre 2011, available at :

<https://www.ilo.org/dyn/natlex/docs/SERIAL/69975/69182/F1186528577/MAR-69975.pdf> (consulté le 13/06/2022).

<sup>78</sup> Houinsou Dedehouanou, « La Gouvernance de la fourniture des services de base aux populations en Afrique au sud du Sahara : Un cadre analytique », *Revue Interventions économiques* (50), 2014, Available at <http://journals.openedition.org/interventionsec> (consulté le 19/11/2023).

<sup>79</sup> Ibidem.

profondément enracinés dans les pratiques de gestion publique, l'accès au pouvoir est devenu l'objectif principal des acteurs pour satisfaire leurs intérêts privés et ceux de leurs partisans.

Par conséquent, la recherche de la rente politique et économique est devenue une pratique normale, même chez les particuliers. À ce stade, ces derniers estiment que « toute personne qui cherche à en capter une doit payer »<sup>80</sup>. À l'évidence, dans le cadre du réalisme politique, qui se fonde sur un pragmatisme utilisé par les décideurs à travers des moyens manipulés, le peuple préfère toujours être trompé pourvu qu'il puisse imaginer que des actions sont entreprises en sa faveur et qu'il reçoive des bienfaits<sup>81</sup>.

### **Indicateurs et réalités sur la question de la corruption au Maroc**

La corruption est un phénomène qui peut avoir des effets dévastateurs sur une économie que sur une société. A ce titre, Brigitte Pereira (2008) confirme que la corruption et les mauvaises pratiques publiques et privées constituent : « de lourdes paralysies, du fait de versements réorientés sur des priorités à caractère personnel sous couvert de transactions commerciales »<sup>82</sup>.

Dans cette section, nous allons examiner les données statistiques relatives à la corruption au Maroc, collectées à partir d'indicateurs statistiques sur la corruption. Tout d'abord, nous présenterons ces données et analyserons leur signification (1). Ensuite, nous discuterons les résultats obtenus et présenterons les perspectives possibles pour lutter contre la corruption au Maroc (2).

#### **1- Données statistiques :**

Les données statistiques présentées dans cette étude proviennent principalement du rapport annuel de l'Instance Nationale de la Probité de la

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<sup>80</sup> Béatrice Hibou, Mohamed Tozy, (2009), *Op.cit*, P. 346.

<sup>81</sup> Claude Giboin, « La vertu de Machiavel », *Cahiers philosophiques*, vol. 139(n°4), 2014, P. 91.

<sup>82</sup> Brigitte Pereira, « Éthique, gouvernance et corruption », *Revue française de gestion*, vol. 186(n°6), 2008, P. 55.



Prévention et de la Lutte contre la Corruption (INPPLC), publié en 2021<sup>83</sup>, ainsi que de l'étude détaillée du classement du Maroc<sup>84</sup> dans les principaux indicateurs statistiques sur la corruption, réalisée par la même instance pour la période 2006-2020. Nous avons sélectionné trois types d'indicateurs ayant une relation directe avec la sphère politique et judiciaire marocaine sur une période de trois ans, de 2018 à 2020. Il s'agit de l'Indice de Perception de la Corruption (IPC) (1.1), de l'Indice de l'Etat de Droit (WJP) (1.2) et de l'indice Varieties of Democracy Project (V-dem) (1.3).

### 1.1 L' Indice de Perception de la Corruption (IPC) :

L'IPC est un indicateur qui mesure la perception de la corruption dans le secteur public d'un pays. Plus précisément, il évalue la probabilité de corruption dans l'administration publique, le pouvoir judiciaire, la police, les partis politiques et le secteur des affaires, en utilisant une échelle de 0 à 100, où 0 indique une forte perception de la corruption et 100 une faible perception de la corruption. Les données présentées concernent l'Indice de Perception de la Corruption (IPC) au Maroc sur une période de trois ans, de 2018 à 2020. À partir de 13 enquêtes basées sur des évaluations d'experts et de gens d'affaires, l'IPC mesure les niveaux perçus de corruption du secteur public dans plus de 180 pays et territoires.

**Tableau n°1. Évolution de l'indice de perception de la corruption IPC au Maroc :**

	2018	2019	2020
Score	43	41	40
Classement	73	80	86
Nbre pays	180	180	180

<sup>83</sup> INPPLC, Rapport annuel 2021, available at : <https://inpplc.ma/fr/node/535>

<sup>84</sup> INPPLC, Classement du Maroc dans les principaux indicateurs statistiques sur la corruption, 2021, available at : <https://inpplc.ma>

## **Statistiques sur la corruption et Rapport annuel de 2021 introduits par l' INPPLC**

*Selon les données présentées dans le tableau, le Maroc a connu une série de baisses dans l'IPC. En 2018, le Maroc avait un score IPC de 43 et était classé 73ème sur 180 pays dans le monde. En 2019, le score IPC est tombé à 41 et le classement a chuté à la 80ème place. En 2020, le score IPC est passé à 40 et le Maroc a été classé 86ème sur 180 pays.*

*On peut déduire que le classement du Maroc dans le monde par rapport à d'autres pays a également baissé, passant de la 73ème place en 2018 à la 86ème place en 2020.*

### **1.2. L'Indice de l'Etat de Droit (WJP) :**

*L'Indice de l'État de droit (WJP) fournit des données classées par facteurs, rang mondial, rang régional et rang de revenu. Il mesure la performance en termes d'état de droit dans 139 pays répartis entre huit facteurs : Contraintes aux Pouvoirs du Gouvernement, Absence de Corruption, Gouvernement Ouvert, Droits Fondamentaux, Ordre et Sécurité, Application des Règlements, Justice Civile et Justice Criminelle.*

- MOROCCO OVERALL GLOBAL RANK : 90/139
- MOROCCO OVERALL REGIONAL RANK : 5/8



**Tableau n°2. Évolution de l'Indice de l'Etat de Droit (WJP) au Maroc**

<i>Factor</i>	<i>Glob al rank</i>	<i>Regiona l rank<sup>85</sup></i>	<i>Income rank<sup>86</sup></i>
<b>Powers</b> <i>Constraints on Government</i>	75/1 39	3/8	8/35
<i>Absence of Corruption</i>	89/1 39	5/8	10/35
<i>Open Government</i>	97/1 39	2/8	15/35
<i>Fundamental Rights</i>	110/ 139	6/8	19/35
<i>Order and Security</i>	91/1 39	5/8	16/35
<i>Regulatory Enforcement</i>	58/1 39	3/8	3/35
<i>Civil Justice</i>	69/1 39	5/8	6/35
<i>Criminal Justice</i>	99/1 30	6/8	19/35

A la lecture de tableau, on peut enregistrer qu'en termes de « Contraintes sur les pouvoirs du gouvernement », le Maroc se situe au 75ème rang mondial sur 139 pays évalués, ce qui le place au troisième rang régional et au huitième rang de revenu. Cela indique que le gouvernement marocain est considéré comme étant relativement limité dans ses pouvoirs.

<sup>85</sup> Countries and jurisdictions measured in the Middle East and North Africa region: Algeria, Egypt, Iran, Jordan, Lebanon, Morocco, Tunisia, United Arab Emirates

<sup>86</sup> Pays et juridictions à revenu moyennement faible : Algérie; Angola; Bangladesh; Bénin, Bolivie; Cambodge; Cameroun; Côte d'Ivoire; El Salvador; Ghana; Honduras; Inde; Kenya; République kirghize; Mauritanie; Moldavie; Mongolie; Maroc; Myanmar; Népal; Nicaragua; Nigeria; Ouzbékistan; Pakistan; Philippines; République arabe d'Égypte; République du Congo; Sénégal; Sri Lanka; Tanzanie; Tunisie; Ukraine; Vietnam; Zambie; Zimbabwe

*S'agissant d'« Absence de corruption », le Maroc se situe au 89ème rang mondial, au cinquième rang régional et au dixième rang de revenu. Cela montre que la corruption est un problème persistant dans le pays.*

*En termes de « Gouvernement ouvert », le Maroc se classe à la 97ème place sur 139 pays, avec un score de 2 sur 8, ce qui indique que les citoyens ne disposent pas d'un accès suffisant aux informations gouvernementales et que les institutions gouvernementales manquent de transparence.*

*Concernant « Fundamental Rights », le Maroc se classe à la 110ème place sur 139 pays, avec un score de 6 sur 8, ce qui indique que des améliorations sont nécessaires dans la protection des droits fondamentaux des citoyens, tels que la liberté d'expression et la liberté de la presse.*

*S'agissant de « Order and Security », le Maroc se classe à la 91ème place sur 139 pays, avec un score de 5 sur 8, ce qui indique que le pays a encore des défis à relever en matière de sécurité intérieure et de lutte contre la criminalité.*

*Concernant « Regulatory Enforcement », le Maroc se classe à la 58ème place sur 139 pays, avec un score de 3 sur 8, ce qui indique que la mise en application des lois et des réglementations doit être améliorée pour garantir une justice équitable.*

*En termes de « Civil Justice », le Maroc se classe à la 69ème place sur 139 pays, avec un score de 5 sur 8, ce qui indique que des améliorations sont nécessaires dans le domaine de l'administration de la justice civile, notamment en ce qui concerne la rapidité et l'efficacité des procédures judiciaires.*

*En termes de « Criminal Justice », le Maroc se classe à la 99ème place sur 130 pays, avec un score de 6 sur 8, ce qui indique que le pays doit encore améliorer l'efficacité de son système de justice pénale et garantir un accès équitable à la justice pour tous les citoyens.*



### 1.3. L'indice Varieties of Democracy Project (V-dem)

L'indice Varieties of Democracy Project (V-Dem) est un indicateur de la qualité de la démocratie et de la gouvernance dans un pays, et il est basé sur un certain nombre de facteurs, y compris la corruption politique, législative et judiciaire.

La mesure de la corruption comprend cinq types distincts de corruption qui couvrent à la fois différents domaines et différents niveaux de la sphère politique. Dans le domaine du pouvoir exécutif, les mesures distinguent également la corruption principalement liée aux pots-de-vin et la corruption liée aux détournements de fonds dans 179 pays.

**Tableau n°3. Évolution de l'indice Varieties of Democracy Project (V-dem) au Maroc**

	<b>018</b>	<b>019</b>	<b>020</b>
<i>Indicateur de la corruption législative</i>	0,28	0,28	0,28
<i>Indicateur de la corruption judiciaire</i>	,077	,077	,077
<i>Indice de la corruption politique</i>	,436	,436	,436
<i>Indice de corruption de l'exécutif</i>	,119	,119	,119
<i>Indice de corruption du secteur public</i>	,541	,541	,541

*L'indicateur de la corruption législative est resté stable à -0,28 pour les trois années étudiées, ce qui peut suggérer que la situation de la corruption législative n'a pas évolué pendant cette période.*

*De même, l'indicateur de la corruption judiciaire est resté constant à 0,077 pour les trois années, indiquant qu'il n'y a pas eu d'amélioration ou de détérioration significative de la corruption judiciaire pendant cette période.*

*L'indice de la corruption politique est également resté inchangé à 0,436 pour toutes les années étudiées, ce qui indique une absence d'amélioration de la situation de la corruption politique au Maroc.*

*L'indice de la corruption de l'exécutif est également resté stable à 0,119 pour toutes les années, ce qui suggère qu'il n'y a pas eu de changement significatif dans la situation de la corruption au niveau exécutif.*

*Enfin, l'indice de la corruption du secteur public est resté constant à 0,541 pour toutes les années, ce qui montre que la situation de la corruption dans le secteur public n'a pas évolué pendant cette période.*

*Dans l'ensemble, les données présentées suggèrent que la situation de la corruption au Maroc n'a pas connu de changement significatif au cours des trois dernières années étudiées.*

## **2- Discussions et perspectives**

*En obtenant un score de 39/100 dans l'indice de perception de la corruption, le Maroc a enregistré une série de baisses de cet indicateur, amorcée en 2018 avec un score de 43/100, pour perdre deux places en 2019 avec un score de 41/100, puis un recul d'une place en 2020 avec un score de 40/100.*

*On peut déduire que le classement du Maroc dans le monde par rapport à d'autres pays a baissé, passant de la 73ème place en 2018 à la 86ème place en*



2020. Ces données indiquent que la perception de la corruption au Maroc s'est dégradée au cours des trois dernières années, avec une diminution régulière du score IPC et une chute de plusieurs rangs dans le classement mondial.

Ces résultats montrent que la question de la corruption dans le secteur public au Maroc peut être considérée comme une préoccupation majeure pour le pays. Toutefois, il est important de souligner que l'IPC ne mesure pas directement la corruption elle-même, mais plutôt la perception de la corruption. Ces chiffres restent encore élevés et soulignent la nécessité de prendre des mesures pour renforcer la transparence et la responsabilité dans les institutions publiques, afin de restaurer la confiance des citoyens et de renforcer la stabilité politique et économique.

Concernant l'indice de l'Etat de Droit au Maroc, bien que des progrès aient été réalisés dans certaines dimensions, il reste encore des défis importants à relever dans les autres dimensions. Une attention particulière devrait être accordée à l'amélioration de l'accès des citoyens à l'information gouvernementale, à la protection des droits fondamentaux, à la sécurité intérieure, à l'application des lois et des réglementations, ainsi qu'à l'efficacité des systèmes de justice civile et pénale.

Au niveau arabe, le Maroc se classe au neuvième rang (9), précédé par les Émirats, le Qatar, l'Arabie Saoudite, le Sultanat d'Oman, la Jordanie, la Tunisie, le Koweït et le Bahreïn, suivis par douze (12) pays, alors qu'il occupe une position intermédiaire au niveau africain, précédé par onze (11) pays.

L'INPPLC a également étudié les liens entre les taux élevés de corruption, la violation des droits et libertés, et le dysfonctionnement de la démocratie, qui ont été confirmés par l'indice de perception de la corruption, en scrutant ce constat à la lumière des résultats de l'indice de liberté. A ce titre, le Maroc enregistre une note négative dans les deux sous-indices liés aux droits politiques et civils, en plus de son recul dans les deux sous-indices connexes liés à l'efficacité **judiciaire** et l'**intégrité du gouvernement**, émanant de l'indice de

liberté économique. A cela s'ajoute sa régression dans les deux sous-indicateurs connexes liés à la justice pénale et au gouvernement ouvert émanant de l'indice de l'état de droit, en plus de l'insuffisance notable au niveau des droits liés à la participation à la préparation et à l'**exécution** du **budget** annuel de l'État, comme le souligne l'indice du budget ouvert de 2021.

En surveillant la progression de la corruption à l'échelle nationale, l'instance a également utilisé des sondages d'opinion dans le cadre de l'indice de confiance. Les résultats pour 2021 ont confirmé l'ampleur croissante du phénomène de la corruption, avec 95 % des personnes interrogées affirmant que la corruption est présente au Maroc. Parmi elles, 66 % estiment qu'elle est très répandue, tandis que 27 % la considèrent plutôt répandue.

**En ce qui concerne les poursuites judiciaires**, sur la base du rapport du Ministère Public pour l'année 2020, la ligne téléphonique directe (numéro vert) dédiée à la réception des dénonciations des actes de corruption a enregistré un total de 15 743 appels, ayant conduit à 164 arrestations de suspects en flagrant délit, liées à des pots-de-vin allant de montants n'excédant pas 50 dirhams à des montants relativement élevés, s'élevant dans un cas à 300 000 dirhams.

Le rapport du Ministère Public précise que ces cas de flagrants délits concernent les agents d'autorité, la gendarmerie royale, la sûreté nationale, le secteur des eaux et forêts, la protection civile et les forces auxiliaires, la santé, la justice, le secteur d'équipement et transport ainsi que d'autres secteurs.

S'agissant des délits de corruption présentés aux chambres des crimes financiers, le rapport du Ministère Public pour l'année 2020 a confirmé que les services des crimes financiers ont reçu 606 plaintes, dont 367 en 2020 et 239 étaient en cours d'instruction en 2019. La décision a été prise de classer 115 d'entre eux, de réaliser des procès-verbaux pour 330, de transmettre 68 plaintes aux autorités compétentes et 93 plaintes sont encore en cours de traitement.

Après avoir analysé la situation de la corruption au Maroc à travers divers indicateurs et constaté la corrélation entre cette situation et les



*régressions observées dans les rapports internationaux sur l'état de droit, les droits politiques et civils, la participation à la préparation et à l'exécution du budget, ainsi que la faiblesse de l'efficacité du système judiciaire, il est important de souligner que les répercussions de la corruption sont multiples. Elles vont bien au-delà de la fragilisation de la dynamique de développement et ont des impacts négatifs sur les structures de production ainsi que sur les déséquilibres économiques et sociaux. Cette réalité a été clairement mise en évidence dans le rapport de Bank Al-Maghrib pour l'année 2021, présenté par Monsieur le Gouverneur devant Sa Majesté. Il est donc impératif de reconsidérer les approches adoptées jusqu'à présent et de prendre des mesures plus fortes et plus décisives pour lutter contre la corruption.*

*En somme, pour garantir une gouvernance transparente et efficace, les décideurs politiques doivent placer la gouvernance et la lutte contre la corruption au centre de toutes les politiques publiques de développement. A ce titre, la bureaucratie compromise par ce système est généralement utilisée dans une logique clientéliste, ce qui cause des dommages considérables à la société. En d'autres termes, les pratiques de favoritisme, de népotisme et de corruption qui favorisent la loyauté personnelle plutôt que la compétence professionnelle ont infesté le service public, compromettant ainsi sa capacité à fonctionner efficacement et de manière impartiale pour le bien commun.*

*La problématique de la corruption au Maroc révèle plusieurs paradoxes : « d'un côté, un discours politique fort contre ses méfaits et une assise juridique et réglementaire relativement suffisante pour l'endiguer, et, de l'autre côté, une résistance active de ceux qui en bénéficient, une tolérance sociale en hausse constante et des pratiques de corruption persistantes largement visibles, mesurables et reconnues par les acteurs »<sup>87</sup>. En effet, les gens peuvent considérer que la corruption est un mal nécessaire pour faire des affaires ou pour obtenir des services publics. Cette tolérance peut rendre la lutte contre la corruption plus difficile.*

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<sup>87</sup> Kamal El Mesbahi, (2013), *Op.cit*, P. 95.

## Conclusion

*Il est essentiel donc de reconnaître que la transition politique au Maroc est un processus complexe qui nécessite une approche proactive pour lutter contre la corruption. Cette maladie reste largement soutenue par le système clientéliste qui favorise l'appartenance à un groupe plutôt que la compétence, ainsi que par la personnalisation du pouvoir qui corrompt les institutions.*

*Pour lutter efficacement contre la corruption, il est nécessaire de faire face aux facteurs institutionnels et culturels qui peuvent favoriser les pratiques corrompues. Les institutions doivent être renforcées et dotées de moyens suffisants pour garantir une transparence et une responsabilité accrues dans la gestion des affaires publiques.*

*De plus, la lutte contre la corruption ne peut réussir que si le système judiciaire soit indépendant et impartial. Pour lutter efficacement contre la corruption, il est essentiel que la justice joue un rôle clé dans la poursuite des auteurs de ces actes répréhensibles. Il est également indispensable que des mesures soient prises pour éliminer les liens corruptibles dans le système judiciaire et rétablir la confiance dans l'État de droit. Toutefois, lorsque les affaires de corruption risquent d'être étouffées ou biaisées en faveur des personnes corrompues, cela entrave la capacité du système judiciaire à être impartial et touche à sa crédibilité. En d'autres termes, il est difficile de lutter contre la corruption si la justice elle-même est touchée par ce fléau, en permettant à des individus ou des groupes de contourner les lois pour servir leurs intérêts personnels.*

*Pour combattre efficacement la corruption, il est donc nécessaire de mener des réformes profondes qui s'attaquent à toutes ces composantes intimes du système. Des efforts doivent être faits pour promouvoir un État capable, qui peut assurer la sécurité, fournir efficacement des services publics, répartir plus démocratiquement le pouvoir politique et préserver un environnement juridique*



*impartial. Cela nécessite également des efforts concertés pour renforcer les institutions juridiques et pour changer les attitudes sociales.*

*A ce titre, il est ainsi crucial d'identifier les foyers et les dynamiques de ce fléau pour élaborer des stratégies ciblées et veiller à ce que les acteurs agissent en toute transparence et responsabilité. En outre, la sensibilisation du public à l'importance de la lutte contre la corruption est cruciale. Les citoyens doivent être sensibilisés et les acteurs de la société civile doivent être formés et impliqués à dénoncer les actes de corruption.*

*La promotion d'un mouvement citoyen actif et engagé peut contribuer à soutenir les efforts institutionnels dans la lutte contre la corruption. Les nouvelles générations politiques, formées dans les associations de la société civile, peuvent jouer un rôle important dans cette lutte, mais cela nécessitera une persévérance et une méthode inlassables pour déconstruire un système solidement construit.*

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***Establishing a culture of peace and peaceful societal  
coexistence and its impact on economic stability  
Sudan's application study as an African state during the period (1956 - 2023)***

***Prof. Dr. Salah Mohamed Ibrahim Ahmed,***

*professor of economics, dean of the faculty of economics and banking studies, White Nile University, Kosti, Sudan*

***Dr. Abdelrahman Mohammedain Abdelrahman Ahmed,***

*Associate Professor, White Nile University & EL Imam EL Mahadi University — Kosti- Sudan*

***Abstract:***

*The study aimed to introduce the value of peace, security and safety for human life, and knowing that peace and security guarantees the living and luxury security, and that the lack of societal peace and security leads to the deterioration of the economic situation, and the problem crystallizes in the lack of peace and security, the hostile spirit prevailed, the many aggression and injustice, and the survival of the strongest has become And whoever cannot fight does not exist in life and his fate of annihilation and disappearance, and highlights the importance of studying for peace, security and safety is the importance, value and urgent need at the present time, and the study used the historical descriptive theoretical approach, and the study resulted in the most important results where Sudan did not know peace, stability and community coexistence Since he obtained his independence and one year before independence, as a result of tribal and regional conflicts, a sense of injustice and marginalization, and the establishment of armed rebel movements supported by external parties, and that Sudan has not witnessed stability in the ruling due to the large number of military coups that followed the power of government in Sudan, and just as the leaders and the elite are Political was characterized by weakness and fragility and lack of clear vision and programs for the many parties that do not agree on national principles and constants, and another is that colonialism is behind a legacy that is burdened with the differences, racist cliffs and class division charged with hatred, hatred and a sense of despicable inferiority that leads to instability and wars, and the emergence of several rebellious*

movements. It calms down as the movement of a movement, after which several movements are established, and the most important recommendations the state should meet the vulnerabilities of foreign external interference and not to submit to any initiative to bridge the rift from the outside, provided that the dialogue inside Sudan is in a national spirit away from the interference in the Sudanese internal affairs, and the necessity to refer to The voice of the mind, the rationalization, the rejection of the division, the diaspora, the autism and the lack of submission to the dispersal of the plural of insults, insults, phrases and importing words that are exotic on Sudan, the government must vigilant, cautious and caution from agents and employment labor and betrayal, and to preach and take the lessons from the countries that have collapsed and slipped into the abyss due to dispersion and tribal cliff And racism and regionalism.

**Key words:** *peace culture, peaceful societal coexistence, economic stability.*

## **Introduction**

*Peace and peace are two inseparable terms that have a sublime value, and are closely related to man, human behavior, morals, and spiritual values upon which humanity is built. God), and man is derived from man from intimacy and affinity against brutality and savagery, and the human soul is familiar with peace and stability and rejects violence, terrorism and disturbances, and therefore we find man, since his creation, longing for stability and peaceful coexistence and rejecting conflict, conflicts, wars and fighting, and desires a stable life and a stable life for God's saying: (And to you There is stability and enjoyment on earth for a while) Surat Al-Baqarah, verse 36. Human souls are innate in communal coexistence in tolerant, cooperative, peaceful societies that love goodness for others, and societies love peaceful coexistence, cooperation, solidarity and collaboration in order to create a safe and stable environment that provides them with their sustenance in abundance without conflict, wars or Fighting over economic resources, sovereignty, control and hegemony, and man by nature loves the king who does not wear out, eternity, continuity and continuity in achieving goals and desires and looking forward to what is better*



and better, and hates humiliation, humiliation, homelessness, displacement and instability in his daily life, and from this standpoint man must know the value of community peace permanent peace and a stable and comfortable life, and rejects violence, terrorism, aggression, looting, looting, plotting and bullying others under the pretext of plundering their resources and creating a chaotic life that disturbs their peace and makes their lives hell and torment, as is happening today in terms of killing, displacement, looting, looting, violence and an insecure life that man does not desire, and therefore it is necessary to broadcast Spreading a culture of societal peace and peaceful coexistence that guarantees a tolerant and peaceful society, to contribute to building an environment of tolerance and virtue, rejecting violence and conflicts between peoples, and creating a healthy society that honors the human being who has been honored by the Creator.

*The first axis: the methodological framework and previous studies*

### **1-1. Study problem**

*The world today has spread wars, conflicts and conflicts, there is no peace and security, the hostile spirit has prevailed, aggression and injustice have increased, and survival has become for the strongest, and whoever cannot fight does not exist among all creatures, and his fate is extinction and disappearance*

### **2-1. The importance of the study**

*Because of the importance and necessity of peace, security, and safety at a time when the spirit of aggression, oppression, domination, injustice, tyranny, and blocs prevailed, and consequently panic, fear, and terror prevailed among the peoples of the world, and the fate became unknown, and life became more precarious, displacement, and an escape from death that pursues man anywhere and at any time. Peace and security are wandering in the land without evidence or a specific destination. He struggles with the challenges and obstacles of life and suffers hardship and harsh conditions from the scourge of wars, homelessness, displacement and refuge in the land.*

### **3-1. Objectives of the study**

- 1/ Understanding the value of peace, security and security for human life.
- 2/ Wars, conflicts and aggression lead to instability and social peace.
- 3/ Knowing that peace and peace guarantee a secure, stable and well-being life.
- 4/ The lack of societal peace and peace lead to a deterioration in the economic situation.

### **4-1. Study hypotheses**

- 1/ There is a significant relationship between peace, community coexistence, stable life, and decent living.
- 2/ There is a substantial relationship between community peace, coexistence, wars, conflicts and tribal disputes.
- 3/ There is a significant relationship between social peace, coexistence and economic stability.

### **5-1. Study methodology**

The study used the descriptive historical-theoretical approach.

### **6-1. Limitations of the study**

Spatial borders: Sudan, Africa.

Temporal boundaries: 1956-2023.

**Objective limits:** study of spreading the culture of peace, peace and community coexistence and its impact on economic stability.

### **7-1. Sources and tools for collecting study data**

The primary sources include the Holy Qur'an and the Noble Prophet's Sunnah, and the secondary sources include books, references, volumes, magazines, periodicals, and the Internet.



## **8-1. Structure of the study**

*The structure of the study consists of the first axis, the methodological framework and previous studies, the second axis: the theoretical and conceptual framework, and the third axis: the study literature on African and Sudanese peace and security, the conclusion, results, recommendations, and a list of sources and references.*

## **9-1. Previous studies**

*In this regard, several workshops, seminars, dialogues, forums, and peace forums were held that focused on the political aspect, neglecting the social and societal aspects, and did not take into account the dissolution of tribalism and racism, and also did not study the subject carefully from several aspects, and therefore there were no previous studies that could be referred to.*

*The second axis: the conceptual theoretical framework*

## **1-2. The concept of peace**

*A general holistic concept that indicates stability, security, and safety, and the human being in his life seeks stability, a safe life, and a decent life, and also he is in a continuous search for a stable living environment, as he moves away and avoids destabilization and homelessness, and peace is a word that has its meanings and meanings, peace is safety from the misfortunes and calamities of time And man by nature loves security and security from fear, according to the Almighty's saying: (He who fed them from hunger and secured them from fear) Surat Elaf Quraish, verse 5, so Islam is a comprehensive religion that calls for peace, peace, love for others, cooperation, brotherhood, compassion, cohesion, and love for others, and it hates injustice and aggression, and that people live in love And harmony and harmony, and he hates transgression, aggression, violence and killing, as in the Almighty's saying: (And whoever kills a soul, it is as if he had killed all people, and whoever saves it, it is as if he saved all people). Believers fight and make peace between them, so if one of them transgresses against the other, then fight that which transgresses until it fulfills the command*

of God) And the Almighty says: (Fighting is ordained for you, and it is hateful to you) Islam hates fighting, fighting, and warfare, and commands man to stay away from fighting, wars, conflicts, and disputes because they are destructive, destructive, and destabilize human life. It makes human life suffer, loss, destruction and ruin.

*Destructive and destructive and destabilizes human life, and makes human life suffer, loss, destruction and ruin.*

## **2-2. Societal conditions and coexistence in Africa**

*As for the countries of Africa, they are countries in which life is bad and injustice and aggression spread. We find the continent of Africa characterized by conflict, wars and fighting in order to reach power and wealth, as well as this continent inhabited by many tribes, races, races, languages, dialects and diverse and different cultures, and it has customs, traditions, legacies, customs, and African countries rule it African customs, and the rule is military, and there is no democracy in the rule of the people by the people. Rather, there are military leaders and generals in power, and therefore there are many military coups in it and the army controls the rule in it, and therefore there are many security breakdowns, lack of peace, security and safety, and there are many wars and conflicts over power and there is no stability. and societal peace, there is a lot of displacement and refuge in neighboring countries, and there is no peace, peace, security, and stability, and there is a lot of flight, displacement, famine, and abnormal death, and there are almost no ideals and morals, and the life of the jungle prevails, beatings, looting, robbery, injustice, oppression, and an insecure life, and the African peoples tend to violence, killing, bloodshed, and grinding. The prison, and the human being who was honored by the Almighty God, has no value or dignity, as he can be slaughtered, chased, and attacked. The African continent is characterized by chaos, wars, weapons, destruction, and devastation. They destroy their homes with their own hands and kill themselves by themselves.*



Therefore, African peoples are unproductive, produce, market death, spread terror among their people, and relentless wars. It burns and destroys all green and dry land, and the African peoples are increasing in disease, ignorance, malnutrition, poverty, and death, and these peoples live on relief, aid, gifts, and grants. And societal coexistence, peoples who have ground themselves and cannot live in security, peace and peace, and given the wars, killings, displacement and insecurity that Africa is experiencing, and therefore the African Peace and Security Council was established to look into these conflicts, disagreements, rivalries, the large number of weapons and the brave fighters who do not fear death and do not care how They kill or fight, and death and life are equal to them. They are tired of living and life in such harsh conditions. War ignites in them in a few seconds. Corruption, theft, looting, plunder, and trespassing on other people's property spread among them. In African countries, it is increasing day by day, just as it has become an African that suffers and lives under the fire of wars, drinks the cups of death's poison and condemns itself to death, just as an Africa in which the system of government changes in an unusually continuous manner, and also suffers from economic fragility, the horrific deterioration of economic conditions and weakness in the infrastructure Weakness in individual incomes, national income, gross domestic product, and poor health, educational, security, defense, and judicial conditions.

Establishing a culture of peace and social coexistence in African countries, renouncing extremism, terrorism and the struggle of armed movements, unregulated armaments and always carrying arms in a terrifying manner created a kind of instability and ignited war and spread fear and panic among African peoples, which made most African countries insecure, and this has happened That was when genocide took place in many African countries, and the outbreak of wars in Africa was caused by the suppression of freedoms, injustice, marginalization, inequity in the distribution of wealth and income, and poor development, and African countries were affected by the culture of colonialism. Help in the absence of peace and a stable life, the culture of peace and peace is consistent with democracy, freedom and justice, the spread of tyranny and the use of coercive force, oppression and domination and the creation of an insecure

*and stable life, and life conditions characterized by cruelty, killing, rivalry and creative chaos, and therefore most African countries did not witness peace, stability and safety, and then The great superpowers use with the African countries a policy of division that prevails with the aim of being preoccupied with wars and deadly conflict and neglecting the optimal exploitation of its resources and benefiting from its resources, and this is the root and stick policy that makes the African countries dependent states affiliated with the sovereign, pioneering and dominant great powers over the African peoples and African leaders and uses with them The policy of subordination, subordination, humiliation and humiliation.*

### ***3-2. the effects of external interference in African affairs***

*Most of the African countries continued to suffer under the pressure and hegemony of the superpowers, which made the African countries live without peace and lose their resources and live under the command and sovereignty of the great powers. And the will of the African countries, making them shackled and bound by the decisions of the superpowers to do what they want, and make them bereft of will and determination, do not progress or develop, and live under the line of poverty, hunger and disease, and do not know peace, peace and social coexistence, and kill each other and do not enjoy peace and safety, just like the life of the forest , which does not know peace, social coexistence, and a stable life, and this matter depends on disciplined freedom that fights chaos and gives everyone his right and does not conflict with the interests of others. Peace is a value and sound human behavior that does not leave chaos a gap through which it penetrates among peoples, and man by his instinct seeks peace, stability and the spirit of coexistence Security, well-being, and decent living. African countries were dominated by the spirit of bickering, hatred, disagreement, and racial and ethnic strife. African countries, since they gained their independence, have not known peace and peaceful coexistence. Rather, they have been suffering from the scourge of wars, division, separation, fragmentation, dismemberment, hatred of each other, encroachment, injustice, entanglement, and clashes that do not know*



*their way to democracy and freedom. Disciplined, peace and peace, that's what made*

*Entanglement and clashes that do not know their way to democracy, disciplined freedom, peace and peace, this is what made Africa suffer humiliation and humiliation, and death haunts its people everywhere and there is no language of dialogue and a culture of accepting opinion and other opinions, so what African countries are experiencing today calls for several conferences to study the situation What Africa has reached through the loss of safety and social peace among its peoples, and we are living with this bitter reality and an environment fraught with tension, turmoil, pressures, conspiracies, strife and schemes that want African countries to live in conflict and conflict and not exploit their resources or enjoy them or achieve economic conditions that lead to prosperity and a decent life. Rather, they will remain forever at the bottom, and their peoples will be oppressed, humiliated, belligerent, hostile, intolerant, and non-peaceful and dominated by evil spirits. After that, the superpowers will benefit from African economic resources, and all African countries are rich in natural and human resources, but they cannot exploit and benefit from them to create peace, security and safety.*

### ***The third axis: the conditions of societal coexistence in Sudan***

#### ***1-3. The successive governments that have ruled in Sudan since independence***

*Since Sudan gained its independence in 1956, it has lived in unstable conditions, and it does not have a continuous life at one pace. Ruling, blocks, partisanship and divisions are important factors in establishing peace. So, that each party does not trust or cooperate with the other party, and hollow organizations devoid of future plans and visions, and they do not have principles and constants in which they meet. And separate sects and armed movements that are not united by the unity of the homeland and do not line up around a single vision that serves the goals and interests of the homeland, and loyalty to the party and sect and organization comes first before the homeland, and these parties and sects remained in constant disagreement that they do not rest in mind, and they do not*

know the love of the homeland, as loyalty is to the leader and leader before loyalty to the homeland, And they became divided and divided, with no link that binds and unites them. Rather, they are dominated by hate speech, rivalry, hatred and hatred, eating each other and killing each other. They do not know an entrance to peace. They are afflicted by partisan, racist, tribal and regional strife. Their independence without visions and plans agreed upon by all. Rather, all their concern was for Sudan to be for the Sudanese and for them to rule themselves by themselves without one unified agreed-upon vision.

Only disagreement, dispersion, disunity, and struggle over the chairs of power, and thus the instability of the ruling system and the political system, was the first civilian government after independence in 1956, followed by a military government, and the military regime of November 17 in 1958-1964, despite its strong association with the military institution, granted limited participation from During the elections of the Central Council, the government of General Abboud, which continued to rule until the October Revolution of 1964, then a civilian government headed by Al-Azhari and Abdullah Khalil, and in this period that followed independence, several rebel movements emerged, Ananya 1 and Ananya 2, and it continued for years until it was followed by the second Mayo military coup government in (May 1969-1985) Nimeiri's government during the Mayan era, and he continued to rule for nearly sixteen years. Several rebellious movements also emerged, most notably John Garang's movement in 1983, Hashim al-Atta's coup movement in 1976, the Battle of Jazira Aba in 1970, the movement of mercenaries, and then the popular uprising against the rule of The military in Rajab, April 6, 1985, and the army assumed the reins of government headed by Field Marshal Mohammed Hassan Suwar al-Dahab. A transitional government took over the position of Prime Minister, Dr. Al-Mahdi and Al-Mirghani, which lasted from 1987 to mid-1989.

### **(2-3) The period of the rule of the National Salvation Revolution:**

The third military coup took place on June 30, 1989, headed by Field Marshal Omar Hassan Ahmed Al-Bashir and the leader of the Islamic Movement, Dr. Sheikh Hassan Abdullah Al-Turabi. The Salvation Government devised



specialized conferences for peace and planning, and a system of grassroots conferences, and continued to rule the totalitarian and clutching government, after which disagreement and separation occurred in 1999 under the leadership of al-Turabi, who disagreed with President al-Bashir, and the rule continued with opposition, disagreements, and rebel movements against the government, wars and rivalries, as the government searched for peace and was several The peace agreements of Machakos, Naivasha, Juba, Doha, and others, but these agreements did not last, violations and non-compliance occurred, and they were not crowned with success and continuity. Years until 2010, and a popular referendum was held for the people of the south, and recognition of their right to self-determination regarding secession or unity, and the people of the south chose secession by a large percentage approaching 98% for the option of secession, and South Sudan separated on July 9, 2011 as a separate state from Sudan called the State of South Sudan headed by General Salva Kiir Mayar Det and his deputy Riak Machar, and the state of South Sudan was established and carved out

One-third of Sudan's land, its population, and three-quarters of its wealth and resources, which had a significant impact on the Sudanese economy, which witnessed a period of peace and the cessation of wars, prosperity, great growth, unparalleled economic stability, stability of the Sudanese balance of payments and the trade balance, and foreign trade witnessed a great boom, and an improvement in international relations and foreign trade, and it became Sudan occupies a prominent position in international trade. It was open to the countries of the world. After the separation, the economic situation in Sudan was affected. There was a terrible collapse and deterioration in the country's economy, high prices, poverty, and hunger, lack of liquidity, fuel and sustenance.

### **3-3. The transitional government after the fall of the National Salvation Revolution**

The Sudanese people have become suffering from the deterioration of the political situation, as well as the large number of external pressures on Sudan, plots and schemes to weaken the government and split the ranks of unity, and

weak people's confidence in the system of government, which led to the people going out in peaceful revolutions, popular demonstrations and sit-ins calling for the president and his government to step down from power, and these overthrew The revolution with the rescue regime on December 19, 2018, and the army and civilian leaders assumed power according to an agreement and a constitutional document, but there was a lack of trust between the two parties to the agreement, and there were insults, quarrels, and exchanges of unacceptable phrases and words imported and alien to Sudan, and the contract was broken, and skirmishes, disagreements, and the spirit of hostility, insult, insult, recklessness, and contempt prevailed. Where there was no adult, mature political elite managing the country's affairs with skill and competence, and the political situation worsened until it reached a political impasse, disagreement at a sharp pace, accusations, hatred, erosion of trust, and problems that led to the dissolution of the partnership between the military and civilian leaders, which resulted in a strong struggle and monopolization of power and the solution of both The Sovereignty Council, the Council of Ministers, and all members of the two councils, and the military leaders monopolized the rule and managed the country's affairs militarily on October 25, 2021, and the political situation became tense, and divisions emerged between the political blocs and political parties between supporters and opponents. Initiatives that did not get fat and sang from hunger, as the framework agreement and the democratic bloc emerged and chaos prevailed. Indeed, fierce clashes and bloody and catastrophic fighting broke out, in which lives and victims, both civilians and military, were claimed, on the morning of April 15, 2023, and the sounds of weapons of all kinds resounded, and clouds of thick smoke rose and covered all the sky of the state of Khartoum, the Sudanese capital, so the disaster and the great tragedy were, and the clashes that do not know The armistice destroyed buildings, urbanization, and infrastructure, and terror, fear, and panic prevailed, and displacement to safe, stable places, left all And they left all their possessions, assets, and wealth, and chose to get out with their lives from death that haunts the residents of the capital, and does not know stability and peace, and war thieves and chaos spread among the people, so thefts, looting, robbery, and killing abounded, and the



specter of death began to haunt the Sudanese people, so there was a lack of peace, stability, and societal coexistence, and attacks and aggression on homes became The expulsion of families from their homes and the looting of their cars and all their wealth is a chaos that strikes its mounds and spreads and continues for more than months and tragic manifestations that do not know peace and peace, as the voice of reason and wisdom was absent, and the sound of weapons was loud, warning of the alarm, and the society lost peace, peace, safe coexistence, security, stable living and a comfortable life for what it gained. Support them, so take heed, O people of sight, and the fires ignited that burn and destroy everything around them, not excluding anyone, and people tasted the bitterness of war and people felt their loss of peace and peace, and therefore we must feel the value of social peace, peace, and safe coexistence between members of society, litigation for small matters, cohesion, and community cooperation in what benefits people He keeps evil and satanic hostilities away from them, and instills in their souls love, intimacy, peace and peace so that they can enjoy a life of peace and stability.

#### **4-3. searching for peace in Sudan**

No one talked about the threats to peace and peace, but the problem of southern Sudan came to mind, but what is the relationship of the north to the origin of the problem of the south? Historically, the beginning of the problem of rebellion against government authority was in August 1955, that is, a year before the declaration of independence. It is therefore a premature rebellion, and it is the fruit of the British inheritance of the independent government of Sudan, and this is an old British habit that did not leave a colonial power without leaving behind a rooted, intractable problem that has no solution, such as Kashmir In India, Biafra in Nigeria, and the problems of minorities and races in all the colonies, it is a problem of mistrust that the West has cultivated and continued to nourish with the same psychological element after his departure. Effort in holding several conferences as follows:

*A table showing the conferences and talks that took place in the search for peace and peace*

## *Outputs of the talks Conference venue and talks history*

*Knowing the causes of the problem, its roots and historical influences, the conference concluded with an integrated vision for addressing the core problems and axes for dialogue with the rebel movement. The negotiations extended to about 18 rounds of negotiation. Khartoum, September 9, 1989*

*A constitutional conference was held, the constitution was presented to the people, and the movement recognized the decisions of the dialogue as a basis for resolving the problem. First Nairobi Meeting 11/30 – 12/5/89 Securing a peaceful solution to the problem, holding a referendum to find out the options of the people of the south. Frankfurt talks 23-25/1/92. Agreeing to meet for a second round, recognizing that Sudan is a multi-ethnic, multilingual and multicultural country, the responsibility of each party in determining the form of transitional arrangements, forming a committee to consider the distribution of national income, recognizing the war's destruction of infrastructure and the displacement of families, rebuilding war-affected areas during the transitional period, recognizing That the problem can be solved only through peaceful negotiation. First Abuja 26/5 - 4/6/1992, the agreement of the two parties to the second Abuja negotiations without preconditions. Entebbe negotiations 23-24 February 1993*

*Confirming the commitment of the two parties to the principles put forward in the Abuja Conference (May-June) 1992, negotiating a second meeting in May. The second Nairobi meeting, April 23, 1993*

*Negotiation on ten general principles, five of which were decided upon: the two parties confirmed their adherence to the unity of Sudan and decentralized rule in the transitional period, narrowing the conflict gap and working to build confidence, pledging to work towards peace, appointing a committee to distribute income during the transitional period and establishing a reconstruction commission, defining powers Federal, state and joint. Abuja two 26/4 - 17/5/1993. The agreement to resume negotiations at a later time to resolve continuous issues. The third Nairobi meeting 10-25/5/1993. The two*



parties pledged to provide an appropriate environment for talks to ensure the success of the IGAD peace initiative, to form high-level delegations fully authorized to decide on the matters raised, to allow relief agencies access to the affected areas, to call on the international community to support the initiative, to authorize the IGAD Foreign Ministers Committee to develop a framework and work program for the peace talks.

The first IGAD in Nairobi 3/17/1994. Opening corridors to transport relief to various regions. The responsibility of the IGAD Committee and Operation Lifeline is to follow up on the implementation of the agreement. Nairobi - Relief Corridors Agreement 5/17/1994. It did not produce positive results, so the parties agreed to another meeting on 9/5/1994. The fifth Nairobi meeting on 7/18/1994. The two sides did not agree on specific points, and no statement was issued on the talks. The sixth Nairobi meeting, September 1994. Continuing efforts to achieve peace, working to overcome the differences that emerged in Nairobi in May 1993, forming a committee of ten people to secure access to relief for those affected, issuing the Fashoda Peace Document. Peace from within - Fashoda 4/8/1993. Issuance of the Juba Declaration (for war, yes to peace and national and federal unity), a declaration by all representatives of the political and social forces in southern Sudan of the following: adhering to the unity of the homeland, completing the implementation of the federal system (federal), condemning and rejecting foreign interference, adhering to the achievements of the national salvation revolution, calling for armed forces To answer the call for peace. Juba Forum for Peace Forces 14/5/1994

The Peace Charter (signed in Khartoum in April 1996), putting an end to the fighting and resorting to a peaceful political solution, preserving the unity of Sudan, Sharia and custom are the sources of legislation, taking into account the privacy of some states in issuing their legislation, citizenship is the source of rights, and recognition of the cultural diversity of Sudan, everyone is bound freely Religiosity and belief, distributing powers, wealth and resources fairly to bring about social development, agreement on a transitional period in which stability and a reasonable amount of social development will be achieved in the

south, at the end of which a referendum will be held among the citizens of the southern states for self-determination, the establishment of the Southern States Coordination Council to complete the implementation of the agreements, and this charter led to the signing of Khartoum peace agreement with an estimated number of warring factions and their return to push peace efforts forward. Al-Nasser 6/10/1996

*Establishing a permanent secretariat for the IGAD initiative. IGAD Nairobi talks 7/19/1999. The SPLM renewed its demand for the separation of religion from the state and not stipulating Islamic law as a source of legislation, its insistence on defining the borders of southern Sudan, which includes the regions of the Blue Nile, South Kordofan and Abyei, and its renewal of the call for the confederation project. IGAD talks, Addis Ababa, 5/8/1999. The rebel movement linked the cease-fire to the cessation of oil exports. The government rejected this condition and the IGAD countries denounced it because it is a new matter, and the government indicated that it is committed to a fair distribution of wealth. IGAD Nairobi Summit 2/6/2001*

*Source: Future Studies Series, Major Transformations in Sudan 1989-2000, Center for Future Studies, 1st Edition, February 2002, printed by Al-Salhani Foundation - Damascus, Syria, pp. 63-64-65-66.*

### **5-3. The secession of Southern Sudan**

*Away from the rebellion movement, several factors led to the departure of some southern leaders from the framework of peace after they signed the agreements, among these factors were the sharp tribal differences even between the sons of the same tribe and the aspiration for leadership even through war, and foreign interventions, so Major General Karbino Kuanin rebelled until he was assassinated by the forces of John Qartaq, followed by Dr. Riek Machar, the head of the Coordination Council, who allied again with John Garang. The peace agreement and his march were not affected by their return to the ranks of the rebellion, and the march continued to achieve its desired goals. These agreements that took place between the government and the various factions of*



*the people of the south and the Nuba Mountains (Political Charter - Agreement) Khartoum for Peace - Fashoda Agreement - Nuba Mountains Agreement) led to a major breakthrough in internal and external relations, and it seems clear that the line of peaceful negotiation that the government has followed for years tirelessly to reach the beginnings of peace has borne fruit and yielded peace, goodness and blessings, and the state saw the need to link the peace process in Sudan through development through the Foundation for Peace and Development.*

**Conclusion:** *It includes findings and recommendations as follows:*

### **6-3. Results**

*1/ The study proved that Sudan has not known peace, peace, stability and social coexistence since it gained its independence and one year before independence, as a result of tribal and regional conflicts, a sense of injustice and marginalization, and the emergence of armed rebel movements supported by external parties.*

*2/ The study proved that Sudan did not witness stability in governance due to the large number of military coups that successively overthrew the ruling regime in Sudan.*

*3/ The study confirmed that the leaders and the political elite were characterized by weakness and fragility and the absence of a clear vision and programs for the many parties that do not agree on national principles and constants.*

*4/ The study showed that Sudan is characterized by cultural diversity, languages, races, tribal, racial, ethnic, border, geographical and climatic diversity.*

*5/ The study proved that colonialism left behind a legacy burdened with differences, racism, and class division fraught with hatred, hatred, and a sense of despicable inferiority that lead to instability, wars, and the emergence of several rebellious movements that do not calm down whenever a movement is suppressed, as a result of which several movements arose.*

6/ *The study proved that peace, peace and social coexistence are related to stability, economic growth and economic development.*

7/ *The study showed that colonialism has the upper hand because of the differences it instilled that led to the lack of peace, peace and societal coexistence to this day, in addition to the conspiracy and plans that target the unity, sovereignty and existence of Sudan.*

8/ *The study proved that there are efforts and strenuous endeavors to extinguish the flames of war and rebellion and to build Sudan and its economic progress due to the enormous and abundant economic resources that Sudan enjoys.*

9/ *The study proved that there are great ambitions in the resources of Sudan from several countries representing the eastern and western blocs that fan the fire and ignite strife and hatch conspiracies to divide and fragment Sudan into several small weak states with which it is easy to plunder the wealth and resources of Sudan after tearing it apart and cutting it into parts and small states.*

10/ *The study confirmed that what is happening in Sudan today is nothing but an old plan and conspiracies aimed at peace, peace and social coexistence in order to displace the Sudanese people from their country.*

11/ *The study proved the absence of the voice of reason, wisdom and sophistication to miss the opportunity for those who want to obliterate and distort the identity and belief of the people of Sudan.*

12/ *The study confirmed that the secession of South Sudan was caused by a loss of confidence, a lack of peace and social coexistence, and a sense of injustice and marginalization in the division of resources and the distribution of wealth and power.*

13/ *The study showed that the results of the peace agreement in 2001 in Naivasha led to the stability of the Sudanese balance of payments, the export of oil, and the treatment of the situation of the commercial port during the period of the national unity government from 2005-2010, and then the economic*



deterioration and collapse occurred after the secession of the state of South Sudan.

14/ The study proved that the war and clashes in Sudan are due to hate speech, hatred and settling of scores, the emergence of the phenomenon of revenge, pursuits, quarreling, rudeness, insults and blocs, and the division of leaders and political elites, and the spirit of hostilities prevailed, and the voice of reason and wisdom was absent, and the voice of weapons that did not know peace and social coexistence rose louder, And the lack of stability, security and safety in Sudan so far.

### **7-3. Recommendations**

1/ The state should bridge the gaps of foreign interference and not submit to any initiative to heal the rift from outside, provided that the dialogue within Sudan is in a patriotic spirit, away from interference in the Sudanese internal affairs.

2/ To have dialogue and negotiation, not to deviate from the government, to reject piety abroad, and to work on uniting the ranks, unifying the home front, and staying away from everything that divides the ranks and leaves a loophole to penetrate and target the unity and cohesion of Sudan.

3/ It is necessary to get rid of destructive ideas and sects that do not want peace, peace, social coexistence and stability in Sudan because of the need in the hearts of those who want to divide and fragment Sudan.

4/ It is necessary to build an arsenal and impregnable bridges to build a unified Sudan in which peace, peace and social coexistence prevail, and to fight sedition, eradicate the roots of war, call for peace, tolerance, cohesion, and mend the social fabric, and that the voice of Sudan be raised to the Sudanese.

5/ Necessarily returning to the voice of reason and rationality, renouncing division and diaspora, unity, and not being succumbed to what separates the crowd, such as insults, insults, and imported phrases and words that are foreign to Sudan.

6/ *The government must be vigilant, wary, and wary of agents, mercenary workers, and treason, and we must learn and take lessons from countries that collapsed and slipped into the abyss due to fragmentation, tribalism, racism, and regionalism.*

7/ *The state must take firm positions against all those who want evil in Sudan, tearing and slicing, stopping the greed of states in Sudan, missing opportunities for them, and closing the gaps in front of them.*

8/ *Establishing a culture of peace and peace and widening the circle of participation in the rule of Sudan for all Sudanese who respect its interests and raise their status among the qualified, enlightened class who are jealous of the homeland.*

9/ *Spreading the culture of tolerance, cooperation and cohesion, renouncing racism, tribalism and regionalism, and raising the slogan of Sudan for the Sudanese, and Sudan is a vast and sprawling country that accommodates everyone.*

10/ *Ensuring the achievement of peace, peace, social coexistence and stability, and the renunciation of violence of all kinds that leads to economic stability, growth and development.*

11/ *Attention and serious endeavor to benefit from the resources of Sudan and not to waste them in wars, destabilization, destruction and devastation, and to take into account the rights of all and not to be submissive, and for the spirit of cooperation to prevail so that we achieve the maximum benefit from the resources and prosperity is achieved.*

12/ *That the dialogue and negotiation be between the Sudanese themselves without external interference that spoils the spirit of the agreement, disturbs the atmosphere, instills discord and fuels the fire.*

13/ *The state must govern the voice of reason and rationality, renew trust, unite the ranks, unite the word, call for peaceful dialogue and debate in the best way,*



preserve the preservation and soil of the homeland, and extinguish the fire of wars that do not remain and do not leave an oasis for people.

14/ Paying attention to peace, peace, social coexistence, achieving economic well-being, and living in peace, security, and security in Sudan.

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## Compact Composition Operator of Two Sequences Symbols on $\mu$ -Bergman Space in the Unit Ball

**Dr. BUSHARA EISA HAHAD ABDALLA,**<sup>88</sup>

Assistant of Professor Mathematics, Department of Mathematics  
White Nile University, Kosti, Sudan

### **Abstract:**

Let  $\epsilon \geq 0$  and  $\mu$  be a normal function on  $[0, 1)$ ,  $v(1 - \epsilon) = (2\epsilon - \epsilon^2)^2 \mu(1 - \epsilon)$  for  $\epsilon < 1$ . The bounded or compact weighted composition operator of two sequences symbols  $T_{\varphi_r, \psi_r}$  from the  $\mu$ -Bergman space  $A^{1+\epsilon}(\mu)$  to the normal weight Bloch type space  $\beta_v$  in the unit ball is characterized. The briefly sufficient and necessary condition that the composition operator of sequence symbols  $C_{\varphi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  is given. The briefly sufficient and necessary condition that  $C_{\varphi_r}$  is compact on  $\beta_\mu$  for  $\epsilon > 0$  is given.

### **Key words:**

$\mu$ -Bergman space;  $\mu$ -Bloch space; composition operator; compactness.

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<sup>88</sup> [busharaeisa@gmail.com](mailto:busharaeisa@gmail.com)



## 1 Introduction

Let  $B$  denote the unit ball of  $\mathbb{C}^{1+\epsilon}$ , and  $D$  denote the unit disc of  $\mathbb{C}$ . Suppose the class of all holomorphic functions with domain  $B$  is denoted by  $H(B)$ . Let  $dv$  denote the volume measure on the unit ball  $B$ , normalized so that  $v(B) = 1$ . The surface measure on the boundary  $S_{1+\epsilon}$  of  $B$  is denoted by  $d\sigma$ , normalized so that  $\sigma(S_{1+\epsilon}) = 1$ . When  $\epsilon \geq 1$ , a finite measure  $dv_{\epsilon-1}$  on  $B$  is defined by  $dv_{\epsilon-1}(z) = c_{\epsilon-1}(1 - |z|^2)^{\epsilon-1}dv(z)$ , where  $c_{\epsilon-1}$  is a normalizing constant so that  $v_{\epsilon-1}(B) = 1$ . The class of all bounded holomorphic functions on  $B$  is denoted by  $H^\infty$ .

A positive continuous function  $\mu$  on  $[0, 1)$  is called normal if there are constants  $0 < \epsilon < 1$  such that

- (i)  $\mu(1 - \epsilon)(2\epsilon - \epsilon^2)^{-(1+\epsilon)}$  is decreasing for  $\epsilon < 1$ ;
- (ii)  $\mu(1 - \epsilon)(2\epsilon - \epsilon^2)^{-(1+2\epsilon)}$  is increasing for  $\epsilon < 1$ . For example,

$$\begin{aligned} \mu(1 - \epsilon) &= (2\epsilon - \epsilon^2)(1 + \epsilon) \log^{\epsilon-1} \frac{2}{2\epsilon - \epsilon^2} \text{ and } \mu(1 - \epsilon) \\ &= \left\{ \sum_{k=1}^{\infty} \frac{k^{1+\epsilon}(1 - \epsilon)^{2k-2}}{\log(k + 1)} \right\}^{-1} \quad (\epsilon \geq 0, \epsilon - 1 \text{ is real}) \end{aligned}$$

are all normal functions. In the following,  $(1 + \epsilon)$  and  $(1 + 2\epsilon)$  are always the constants in the definition of the normal function  $\mu$ . Let  $\epsilon = \frac{1}{2}$ .

Let  $\epsilon \geq 0$ , and  $\mu$  be normal on  $[0, 1)$ . The  $\mu$ -Bergman space is defined as

$$\begin{aligned} A^{1+\epsilon}(\mu) &= \left\{ f^2 \in H(B) : \|f^2\|_{A^{1+\epsilon}(\mu)} = \left\{ \int_B |f^2(z)|^{1+\epsilon} \frac{\mu^{1+\epsilon}(|z|)}{1 - |z|^2} dv(z) \right\}^{\frac{1}{1+\epsilon}} \right. \\ &\quad \left. < \infty \right\}. \end{aligned}$$

In particular,  $A^{1+\epsilon}(\mu)$  is the Bergman space  $A^{1+\epsilon}$  when  $\mu(1 - \epsilon) = (2\epsilon - \epsilon^2)^{\frac{1}{1+\epsilon}}$ , and  $A^{1+\epsilon}(\mu)$  is the weight Bergman space  $A_{\epsilon-1}^{1+\epsilon}$  when  $\mu(1 - \epsilon) = (2\epsilon - \epsilon^2)^{\frac{\epsilon}{1+\epsilon}}$  ( $\epsilon > 0$ ).  $A^{1+\epsilon}(\mu)$  is a Banach space with the norm  $\| \cdot \|_{A^{1+\epsilon}(\mu)}$  when  $\epsilon \geq 0$ , and  $A^{1+\epsilon}(\mu)$  is a complete metric space with the distance  $(1 - \epsilon)(f^2, g^2) =$

$\|f^2 - g^2\|_{A^{1-\epsilon}(\mu)}^{1-\epsilon}$  when  $0 < \epsilon < 1$ . At the same time,  $(A^{1+\epsilon}(\mu), \|\cdot\|_{A^{1+\epsilon}(\mu)})$  is a topological vector space when  $\epsilon \geq 0$ .

Let  $\mu$  be normal on  $[0, 1)$ .  $f^2$  is said to belong to the  $\mu$ -Bloch space  $\beta_\mu$  if  $f^2 \in H(B)$  and

$$\|f^2\|_{\mu,1} = \sup_{z \in B} \mu(|z|) |\nabla f^2(z)| < \infty,$$

where complex gradient

$$\nabla f^2(z) = \left( \frac{\partial f^2}{\partial z_1}(z), \dots, \frac{\partial f^2}{\partial z_{1+\epsilon}}(z) \right).$$

$\beta_\mu$  is a Banach space with the norm  $\|f^2\|_{\beta_\mu} = |f^2(0)| + \|f^2\|_{\mu,1}$ .

Let  $X$  and  $Y$  be two holomorphic function spaces on  $B$ , and  $\varphi_r = ((\varphi_r)_1, \dots, (\varphi_r)_{1+\epsilon})$  be a holomorphic self-map of  $B$  and  $\psi_r \in H(B)$ . The weighted composition operator of two sequences symbols  $T_{\varphi_r, \psi_r}$  from  $X$  to  $Y$  is defined by

$$T_{\varphi_r, \psi_r}(f^2) = \psi_r \cdot f^2 \circ \varphi_r \quad (f^2 \in X).$$

If  $\psi_r = 1$ , then the operator  $T_{\varphi_r, \psi_r}$  is composition operator  $C_{\varphi_r}$ . For  $(z + \epsilon) \in B$ , Shenlian Li, Xuejun Zhang and Si Xu [15], we follow their work with small specific changes, use the  $(\varphi_r)_{z+\epsilon}$  to denote the involutions on  $B$  with interchanges the points  $0$  and  $(z + \epsilon)$ , and  $(\varphi_r)_{z+\epsilon}^{-1} = (\varphi_r)_{z+\epsilon}$ . The Bergman ball  $D(z + \epsilon, 1 - \epsilon) = \{z : z \in B \text{ and } |(\varphi_r)_{z+\epsilon}(z)| < 1 - \epsilon\}$  for  $\epsilon < 1$ . We use the symbols  $c, c', c'',$  and  $c'''$  to denote positive constants, independent of variables  $z, (z + \epsilon)$ . But they may depend on some parameters (for example,  $(1 + \epsilon), (1 + \epsilon), (1 + 2\epsilon), (\frac{1}{2} + 3\epsilon), \sigma,$  etc.) or some fixed values (for example,  $\mu(0), \varphi_r(0),$  etc.), with different values in different cases. We call  $E$  and  $F$  are equivalent (denoted by  $E \approx F$  in the following) if there exist two positive constants  $A_1$  and  $A_2$  such that  $A_1 E \leq F \leq A_2 E$ .

The radial derivative

$$Rf^2(z) = \sum_{j=1}^{1+\epsilon} z_j \frac{\partial f^2}{\partial z_j}(z) = \langle \nabla f^2(z), z \rangle \text{ for } f^2 \in H(B).$$

Let  $R_{\varphi_r}(z) = (R(\varphi_r)_1(z), \dots, R(\varphi_r)_{1+\epsilon}(z))$  and



$$H_z(u) = \frac{(1 - |z|^2)|u|^2 + |\langle z, u \rangle|^2}{(1 - |z|^2)^2} \text{ for any } z \in B \text{ and } u \in \mathbb{C}^{1+\epsilon} - \{0\}.$$

Then, we have  $H_{\varphi_r(z)}(R\varphi_r(z)) \leq cH_z(z)$  when  $\Omega = B$  by Theorem 2.12 in [1]. For  $f^2 \in H(B)$ , we write

$$\|f^2\|_{\mu,2} = \sup_{z \in B} \mu(|z|)|Rf^2(z)|.$$

For  $f^2 \in H(B)$ , we write

$$\|f^2\|_{\mu,3} = \sup_{z \in B} \sup_{u \in \mathbb{C}^{1+\epsilon} - \{0\}} \left\{ \frac{\mu(|z|)|\langle \nabla f^2(z), u \rangle|^{1+\epsilon}}{\sqrt{1 - |z|^2}|u|^2 + |\langle z, u \rangle|^2}} \right\}.$$

By [2], and Proposition 1.18 and Theorem 3.1 in [3], we have

$$\|f^2\|_{\mu,3} = \sup_{z \in B} \frac{\mu(|z|)}{1 - |z|^2} Qf^2(z) = \sup_{z \in B} \mu(|z|) \left\{ \frac{|\nabla f^2(z)|^2 - |Rf^2(z)|^2}{1 - |z|^2} \right\}^{\frac{1}{2}}.$$

Therefore,  $\|f^2\|_{\mu,3} = \|f^2\|_{\mu,1}$  when  $\epsilon = 0$ .

In the disc, by [4, 5], we know that  $C_{\varphi_r}$  is always bounded on  $A_{1+\epsilon}^{1+\epsilon}$ , and  $C_{\varphi_r}$  is a compact operator on  $A_{1+\epsilon}^{1+\epsilon}$  if and only if

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

Could the mentioned result as above be generalized to the setting of the unit ball? First,  $C_{\varphi_r}$  is not always bounded on  $A_{1+\epsilon}^{1+\epsilon}$  when  $\epsilon > 0$ ; for example, we take (see [15])

$$\begin{aligned} \varphi_r(z) &= \left( (1 + \epsilon)^{\frac{1+\epsilon}{2}} z_1 \cdots z_{1+\epsilon}, 0, \dots, 0 \right), \\ z + \epsilon &= \left( \frac{1 - \epsilon}{\sqrt{1 + \epsilon}}, \dots, \frac{1 - \epsilon}{\sqrt{1 + \epsilon}} \right) \text{ for } \epsilon < 1 \end{aligned}$$

and

$$f^2(z + \epsilon)(z) = \frac{1 - |\varphi_r(z + \epsilon)|^2}{(1 - \langle z, \varphi_r(z + \epsilon) \rangle)^{\frac{4+3\epsilon}{1+\epsilon}}}.$$

By computation, there is constant  $c$ , independent of  $(1 - \epsilon)$ , so that  $\|f^2(z + \epsilon)\|_{A_{1+\epsilon}^{1+\epsilon}} \leq c$ , and

$$\|C_{\varphi_r}(f^2(z + \epsilon))\|_{A_{1+\epsilon}^{1+\epsilon}} \approx \frac{1}{(\epsilon)^2}.$$

This means that  $C_{\varphi_r}$  is not bounded on  $A_{1+\epsilon}^{1+\epsilon}$  when  $\epsilon \geq 0$ .

Second, the condition for which  $C_{\varphi_r}$  is compact on  $A_{1+\epsilon}^{1+\epsilon}$ , Kehe Zhu gave the result in [6]:

**Theorem A.** Suppose  $\epsilon \geq 0$ . If  $C_{\varphi_r}$  is bounded on  $A_{\epsilon-1}^{1+\epsilon}$  for some  $\epsilon > 0$ , then  $C_{\varphi_r}$  is compact on  $A_{2\epsilon-1}^{1+\epsilon}$  if and only if

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

Theorem A is partly extended to the normal weight Bergman space in [7]:

**Theorem B.** For  $\epsilon \geq 1$ , let  $\mu$  be a normal function on  $[0, 1)$ .

(1) If  $C_{\varphi_r}$  is compact on  $A^{1+\epsilon}(\mu)$ , then

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

(2) If  $C_{\varphi_r}$  is bounded on  $A_{\epsilon-1}^1$  for some  $0 < \epsilon < (1 + \epsilon)^2$ , and

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0,$$

then  $C_{\varphi_r}$  is compact on  $A^{1+\epsilon}(\mu)$ .

As  $C_{\varphi_r}$  is not always bounded on  $A^{1+\epsilon}(\mu)$ , we fail to get the analogous necessary and sufficient conditions for compactness on the unit ball directly. A natural problem is that if can we find some analogous conditions for compactness as in the case of the complex analysis with one variable provided that  $C_{\varphi_r}$  is mapped into a space  $Y$  which contains  $A^{1+\epsilon}(\mu)$ ? We will give and show the following result (see [15]):

**Proposition C.** Suppose  $\epsilon \geq 0$  and  $\mu$  is a normal function on  $[0, 1)$ ,  $v(1 - \epsilon) = (2\epsilon - \epsilon^2)^2 \mu(1 - \epsilon)$  for  $\epsilon < 1$ . Then,

(1)  $C_{\varphi_r}$  is always bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  ;

(2)  $C_{\varphi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  if and only if



$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0$$

In [8], if  $\epsilon \geq 1$  (when  $\epsilon > 0$ ), then we have

$$G_{\varphi_r(z)}^\mu (R\varphi_r(z), R\varphi_r(z)) \approx \frac{(1 - |\varphi_r(z)|^2)^2}{\mu^2(|\varphi_r(z)|)} H_{\varphi_r(z)}(R\varphi_r(z)).$$

If  $\epsilon > 1$ , then  $\int_0^1 \mu^{-1}(1 + \epsilon)d(1 + \epsilon) = \infty$  and  $(\varphi_r)_l \in H^\infty \subset \beta_\mu$  for  $l \in \{1, 2, \dots, 1 + \epsilon\}$ . In fact, X. J. Zhang ([8]) and H. H. Chen ([9]) gave the following result.

**Theorem D.** Let  $\mu$  be normal on  $[0, 1)$ . If  $\epsilon \geq 0$  and  $\|\varphi_r\|_\infty = \sup_{z \in B} |\varphi_r(z)| = 1$ , then  $C_{\varphi_r}$  is compact on  $\beta_\mu$  if and only if

$$\lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{\mu|z|}{\mu(|\varphi_r(z)|)} \{(1 - |\varphi_r(z)|^2)|R\varphi_r(z)|^2 + |\langle \varphi_r(z), R\varphi_r(z) \rangle|^2\}^{\frac{1}{2}} = 0.$$

We will give and show the following result (see [15]).

**Proposition E.** Let  $\mu$  be normal on  $[0, 1)$ . If  $\epsilon \geq 0$ , then  $C_{\varphi_r}$  is compact on  $\beta_\mu$  if and only if

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

We will first discuss the bounded and compact conditions of  $T_{\varphi_r, \psi_r}$  from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$ . As Corollary, we give Proposition C.

## 2 Some Lemmas

We first give some lemmas, to show the main results (see [15]).

**Lemma 2.1.** Suppose  $\mu$  is a normal function on  $[0, 1)$  and  $f^2 \in H(B)$ . Then,  $\|f^2\|_{\mu,1}, \|f^2\|_{\mu,2}$ , and  $\|f^2\|_{\mu,3}$  are equivalent for  $\epsilon \geq 1$  (when  $\epsilon \geq 0$ ), and the controlling constants are independent of  $f^2$ .

**Proof.** We may give the result by Lemma 3 and Theorem 2 in [9].

**Lemma 2.2.** Suppose  $\epsilon \geq 0$ , and  $\mu$  is a normal function on  $[0, 1)$ ,  $\nu(1 - \epsilon) = (2\epsilon - \epsilon^2)\mu(1 - \epsilon)$  for  $0 < \epsilon < 1$ . If  $f^2 \in A^{1+\epsilon}(\mu)$ , then  $f^2 \in \beta_\nu$  and  $\|f^2\|_{\beta_\nu} \leq c\|f^2\|_{A^{1+\epsilon}(\mu)}$ .

**Proof.** If  $f^2 \in A^{1+\epsilon}(\mu)$ , then we have

$$\int_B (1 - |z|^2)^{-\frac{1}{2} + \frac{5}{2}\epsilon + 2\epsilon^2} |f^2(z)|^{1+\epsilon} dv(z) \leq \frac{\|f^2\|_{A^{1+\epsilon}(\mu)}^{1+\epsilon}}{\mu^{1+\epsilon}(0)} \Rightarrow f^2 \in A^{\frac{1+\epsilon}{\frac{1}{2} + \frac{5}{2}\epsilon + 2\epsilon^2}}.$$

By Theorem 2.1 in [3], we have

$$|f^2(z)| \leq \frac{c \|f^2\|_{A^{1+\epsilon}(\mu)}^{1+\epsilon}}{(1 - |z|^2)^{2(1+\epsilon)}} \leq \frac{c' \|f^2\|_{A^{1+\epsilon}(\mu)}}{(1 - |z|^2)^{2(1+\epsilon)}} \quad (z \in B).$$

This means that  $f^2 \in A^{\frac{1}{\frac{1}{2} + 3\epsilon}}$  when  $\epsilon > 0$ . By Theorem 2.2 in [3], we have

$$f^2(z) = \int_B \frac{f^2(z + \epsilon)}{(1 - \langle z, z + \epsilon \rangle)^{\frac{5}{2} + 4\epsilon}} dv_{\frac{1}{2} + 3\epsilon}(z + \epsilon) \quad (z \in B).$$

By Lemma 2.2 in [10], Lemma 2.2 in [11], and Proposition 1.4.10 in [12], we have

$$\begin{aligned} & v(|z|) |Rf^2(z)| \\ & \leq c'' \|f^2\|_{A^{1+\epsilon}(\mu)} \int_B \frac{(1 - |z|^2)^2 \mu(|z|) (1 - |z + \epsilon|^2)^{3\epsilon - \frac{1}{2}}}{|1 - \langle z, z + \epsilon \rangle|^{\frac{7}{2} + 4\epsilon}} \mu(|z + \epsilon|) dv(z + \epsilon) \\ & \leq c'' \|f^2\|_{A^{1+\epsilon}(\mu)} (1 - |z|^2)^{\frac{5}{2} + \epsilon} \int_B \frac{(1 - |z + \epsilon|^2)^{2\epsilon - 1}}{|1 - \langle z, z + \epsilon \rangle|^{\frac{7}{2} + 4\epsilon}} dv(z + \epsilon) \\ & \quad + c'' \|f^2\|_{A^{1+\epsilon}(\mu)} (1 - |z|^2)^{\frac{5}{2} + 2\epsilon} \int_B \frac{(1 - |z + \epsilon|^2)^{\epsilon - 1}}{|1 - \langle z, z + \epsilon \rangle|^{\frac{7}{2} + 4\epsilon}} dv(z + \epsilon) \\ & \leq c'' \|f^2\|_{A^{1+\epsilon}(\mu)}. \end{aligned} \tag{2.1}$$

On the other hand, by the subharmonicity of  $|f^2|^{1+\epsilon}$  on  $B$ , we have

$$\begin{aligned} \|f^2\|_{A^{1+\epsilon}(\mu)} &= \int_B \frac{|f^2(z)|^{1+\epsilon} \mu^{1+\epsilon}(|z|)}{1 - |z|^2} dv(z) \\ &= 2(1 + \epsilon) \int_0^1 \frac{(1 - \epsilon)^{1+2\epsilon} \mu^{1+\epsilon}(1 - \epsilon)}{2\epsilon - \epsilon^2} \left\{ \int_{S_{1+\epsilon}} |f^2((1 - \epsilon)\xi)|^{1+\epsilon} d\sigma(\xi) \right\} d(1 - \epsilon) \end{aligned}$$



$$\begin{aligned} &\geq 2(1 + \epsilon) \int_0^1 \frac{(1 - \epsilon)^{1+2\epsilon} \mu^{1+\epsilon} (1 - \epsilon) |f^2(0)|^{1+\epsilon}}{2\epsilon - \epsilon^2} d(1 - \epsilon) \\ &\geq \frac{(1 + \epsilon)! \Gamma\left(\frac{1}{2} + \frac{5}{2}\epsilon + 2\epsilon^2\right) \mu^{1+\epsilon}(0)}{\Gamma\left(\frac{3}{2} + \frac{7}{2}\epsilon + 2\epsilon^2\right)} |f^2(0)|^{1+\epsilon}. \end{aligned}$$

By (2.1)–(2.2) and Lemma 2.1, we have  $f^2 \in \beta_v$  and  $\|f^2\|_{\beta_v} \leq c \|f^2\|_{A^{1+\epsilon}(\mu)}$ .

**Remark.** Note that

$$\frac{|R[T_{\varphi_r, \psi_r}(f^2)](z)|}{|Rf^2(z)|} \leq \frac{M_0 v(|z|) \|z^2\|}{(1 - |z|^2)}$$

**Lemma 2.3.** Let  $d(z, z + \epsilon) = |(\varphi_r)_{z+\epsilon}(z)|$  ( $z + \epsilon, z \in B$ ) be the Bergman metric on  $B$ . Given  $0 < \epsilon < \frac{1}{2}$  and  $0 < \delta < \frac{1}{2}$ , if  $|z| > 1 - \delta$  and  $d(z, z + \epsilon) \leq \frac{1}{2} - \epsilon$ , then

$$|z + \epsilon| > 1 - \frac{\delta\left(\frac{3}{2} - \epsilon\right)}{-\frac{1}{2} - \epsilon + \delta\left(\frac{1}{2} - \epsilon\right)}.$$

**Proof.** If  $d(z, z + \epsilon) \leq \frac{1}{2} - \epsilon$ , by Lemma 1.2 in [3], then we have

$$\begin{aligned} \frac{(1 - |z|^2)(1 - |z + \epsilon|^2)}{(1 - |zk(z + \epsilon)|)^2} &\geq \frac{(1 - |z|^2)(1 - |z + \epsilon|^2)}{|1 - \langle z, z + \epsilon \rangle|^2} = 1 - |\varphi_r(z + \epsilon)(z)|^2 \\ &\geq \frac{3}{4} + \epsilon - \epsilon^2 \end{aligned}$$

$$\begin{aligned} \Rightarrow \left( \left( \frac{3}{4} + \epsilon - \epsilon^2 \right) |z + \epsilon|^2 \right) |z|^2 - 2 \left( \frac{3}{4} + \epsilon - \epsilon^2 \right) |(z + \epsilon)kz| + |z + \epsilon|^2 \\ - \left( \frac{1}{4} - \epsilon + \epsilon^2 \right) \leq 0 \end{aligned}$$

$$\Rightarrow |z| \leq \frac{|z + \epsilon| + \frac{1}{2} - \epsilon}{1 + \left(\frac{1}{2} - \epsilon\right) |z + \epsilon|}.$$

When  $|z| > 1 - \delta$ , we have

$$\frac{|z + \epsilon| + \frac{1}{2} - \epsilon}{1 + \left(\frac{1}{2} - \epsilon\right)|z + \epsilon|} > 1 - \delta \Rightarrow |z + \epsilon| > 1 - \frac{\delta \left(\frac{3}{2} - \epsilon\right)}{\delta \left(\frac{1}{2} - \epsilon\right) - \left(\frac{1}{2} + \epsilon\right)}.$$

**Lemma 2.4.** Let  $\varphi_r$  be a automorphism of  $B$ . Then,

$$\frac{1 - |\varphi_r(0)|}{1 + |\varphi_r(0)|} \leq \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \leq \frac{1 + |\varphi_r(0)|}{1 - |\varphi_r(0)|}.$$

**Proof.** The result can be obtained by Theorem 1.4 and Lemma 1.2 in [3].

**Lemma 2.5.** Let  $\mu$  be normal on  $[0, 1)$  and

$$g^2(\xi) = 1 + \sum_{s=1}^{\infty} 2^s \xi^{1+\epsilon_s} \quad (\xi \in D),$$

where  $n_s$  is the integral part of  $(\epsilon_s)^{-1}$ ,  $\mu(1 - \epsilon_s) = 2^{-s}$  ( $s = 1, 2, \dots$ ). Then

(1)  $g^2(1 - \epsilon)$  is increasing for  $0 < \epsilon < 1$  and

$$\inf_{0 < \epsilon < 1} \mu(1 - \epsilon)g^2(1 - \epsilon) > 0, \sup_{\xi \in D} \mu(|\xi|)|g^2(\xi)| < \infty;$$

(2) There exists constant  $c > 0$  such that

$$\mu(1 - \epsilon)g^{2'}(1 - \epsilon) \leq \frac{c}{\epsilon} \text{ for all } 0 \leq \epsilon < 1.$$

**Proof.** The results come from Theorem 1 in [13] and Lemma 2.4 in [8].

### 3 Main Results and Proofs

We give and show the main results (see [15]).

**Theorem 3.1.** Suppose  $\epsilon \geq 1$ , and  $\mu$  is a normal function on  $[0, 1)$ . Let  $\varphi_r$  be a holomorphic self-map of  $B$  and  $h^2 \in H(B)$ .

$$(1) \text{ If } \sup_{z \in B} \mu \frac{(|z|)|h^2(z)|}{(1 - |\varphi_r(z)|^2)} (1 + \epsilon) = M < \infty, \text{ then } \sup_{z \in B} (1 - |z|^2) \mu \frac{(|z|)|Rh^2(z)|}{(1 - |\varphi_r(z)|^2)^{1+\epsilon}} \leq cM.$$



(2) When  $\|\varphi_r\|_\infty = \sup_{z \in B} |\varphi_r(z)| = 1$ , if  $\lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{\mu(|z|)h^2(z)}{\mu(|\varphi_r(z)|)} = 0$ , then

$$\lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{(1 - |z|^2)\mu(|z|)Rh^2(z)}{\mu(|\varphi_r(z)|)} = 0.$$

**Proof.** (1) For any  $(z + \epsilon) \in B$ , we take

$$F_{z+\epsilon}(z) = \frac{h^2(z)}{1 - \langle \varphi_r(z), \varphi_r(z + \epsilon) \rangle^{1+\epsilon}} \quad (z \in B).$$

The theorem condition implies that

$$\sup_{z \in B} \mu(|z|)|F_{z+\epsilon}(z)| \leq 2^{1+\epsilon}M. \tag{3.1}$$

By Theorem 2.2 in [3], we have

$$F_{z+\epsilon}(z) = \int_B \frac{F_{z+\epsilon}(\eta)}{(1 - \langle z, \eta \rangle)^{\frac{3}{2}+4\epsilon}} dv_{-\frac{1}{2}+3\epsilon}(\eta) \text{ when } \epsilon > 0 \quad (z \in B).$$

By (3.1), Lemma 2.2 in [11], Proposition 1.4.10 in [12], we have

$$\begin{aligned} \mu(|z|)|RF_{z+\epsilon}(z)| &\leq \int_B \frac{cM(1 - |\eta|^2)^{-\frac{1}{2}+3\epsilon}\mu(|z|)}{|1 - \langle z, \eta \rangle|^{\frac{5}{2}+4\epsilon}\mu(|\eta|)} dv(\eta) \\ &\leq cM \int_B \frac{(1 - |z|^2)^{\frac{1}{2}+\epsilon}(1 - |\eta|^2)^{2\epsilon-1}}{|1 - \langle z, \eta \rangle|^{\frac{5}{2}+4\epsilon}} dv(\eta) \\ &\quad + cM \int_B \frac{(1 - |z|^2)^{\frac{1}{2}+2\epsilon}(1 - |\eta|^2)^{\epsilon-1}}{|1 - \langle z, \eta \rangle|^{\frac{5}{2}+4\epsilon}} dv(\eta) \\ &\leq \frac{c'M}{1 - |z|^2}. \end{aligned} \tag{3.2}$$

$H_{\varphi_r(z+\epsilon)}(R\varphi_r(z + \epsilon)) \leq cH_{z+\epsilon}(z + \epsilon)$  shows that

$$\begin{aligned} &\frac{(1 - |z + \epsilon|^2)|\langle R\varphi_r(z + \epsilon), \varphi_r(z + \epsilon) \rangle|}{(1 - |\varphi_r(z + \epsilon)|^2)} \\ &\leq c(1 - |z + \epsilon|^2)\{H_{\varphi_r(z+\epsilon)}(R\varphi_r(z + \epsilon))\}^{\frac{1}{2}} \leq c. \end{aligned} \tag{3.3}$$

Taking  $\epsilon = 0$  in (3.2), by computation and (3.3), we have

$$\begin{aligned} & \frac{(1 - |z + \epsilon|^2)\mu(|z + \epsilon|)|Rh^2(z + \epsilon)|}{(1 - |\varphi_r(z + \epsilon)|^2)^{1+\epsilon}} \\ & \leq c''M + \frac{(1 + \epsilon)|h^2(z + \epsilon)|(1 - |z + \epsilon|^2)\mu(|z + \epsilon|)|\langle R\varphi_r(z + \epsilon), \varphi_r(z + \epsilon) \rangle|}{(1 - |\varphi_r(z + \epsilon)|^2)^{2+\epsilon}} \\ & \leq c'''M. \end{aligned}$$

(2) When  $\|\varphi_r\|_\infty = 1$ , if

$$\lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{\mu(|z|)h^2(z)}{\mu(|\varphi_r(z)|)} = 0,$$

then, for any  $0 < \epsilon < 1$ , there exists  $0 < \delta < 1/2$  such that

$$\frac{\mu(|z|)|h^2(z)|}{\mu(|\varphi_r(z)|)} < \epsilon \text{ when } |\varphi_r(z)| > 1 - 2\delta.$$

For any sequence  $\{z^j\} \subset B$  satisfying  $\lim_{j \rightarrow \infty} |\varphi_r(z^j)| = 1$ , we write

$$\bar{D}\left(z^j, \frac{1}{3}\right) = \left\{z + \epsilon : (z + \epsilon) \in B \text{ and } d(z + \epsilon, z^j) \leq \frac{1}{3}\right\}.$$

As  $|\varphi_r(z^j)| \rightarrow 1$  ( $j \rightarrow \infty$ ), then there exists positive integer  $N$  such that  $|\varphi_r(z^j)| > 1 - \delta$  when  $j > N$ . By Theorem 8.1.4 in [12], we have

$$d(\varphi_r(z + \epsilon), \varphi_r(z^j)) \leq d(z + \epsilon, z^j) \leq \frac{1}{3} \text{ when } j > N \text{ and } (z + \epsilon) \in \bar{D}\left(z^j, \frac{1}{3}\right).$$

We take  $\epsilon = \frac{2}{3}$  in Lemma 2.3, then

$$|\varphi_r(z + \epsilon)| > 1 - \frac{4\delta}{2 + \delta} > 1 - 2\delta \Rightarrow \frac{\mu(|z + \epsilon|)|h^2(z + \epsilon)|}{\mu(|\varphi_r(z + \epsilon)|)} < \epsilon. \quad (3.4)$$

On the other hand, by Corollary 1.22 in [3], we have

$$d((\varphi_r)_{z^j}(z), z^j) = d((\varphi_r)_{z^j}(z), (\varphi_r)_{z^j}(0)) = d(z, 0) = |z| \leq \frac{1}{6} \text{ when } |z| \leq \frac{1}{6}.$$

If  $|z| \leq 1/6$  and  $(z + \epsilon) \in \bar{D}\left((\varphi_r)_{z^j}(z), \frac{1}{6}\right)$ , then



$$\begin{aligned}
 d(z + \epsilon, z^j) &\leq d\left(z + \epsilon, (\varphi_r)_{z^j}(z)\right) + d\left((\varphi_r)_{z^j}(z), z^j\right) \leq \frac{1}{3} \Rightarrow \bar{D}\left((\varphi_r)_{z^j}(z), \frac{1}{6}\right) \\
 &\subseteq \bar{D}\left(z^j, \frac{1}{3}\right). \quad (3.5)
 \end{aligned}$$

We take  $G_j = F_j \circ (\varphi_r)_{z^j}$ , where  $F_j(z) = \mu(|z^j|)g^2(\langle \varphi_r(z), \varphi_r(z^j) \rangle)h^2(z)$ , and  $g^2$  is the function in Lemma 2.5.

By Lemma 2.24 and Lemma 2.20 in [3], Lemma 1.2 and Lemma 1.23 in [3], (3.4)–(3.5), Lemma 2.2 in [11] and Lemma 2.5, we have

$$\begin{aligned}
 |G_j(z)| &= |F_j[\varphi_r(z)]| \\
 &\leq \frac{c'}{(1 - |(\varphi_r)_{z^j}(z)|^2)^{2+\epsilon}} \int_{\bar{D}((\varphi_r)_{z^j}(z), \frac{1}{6})} |F_j(z + \epsilon)| dv(z + \epsilon) \\
 &\leq \frac{c'}{(1 - |(\varphi_r)_{z^j}(z)|^2)^{2+\epsilon}} \int_{\bar{D}((\varphi_r)_{z^j}(z), \frac{1}{3})} |F_j(z + \epsilon)| dv(z + \epsilon) \\
 &\leq c'' \epsilon \left( 1 - |z^j|^2 \right)^{-(2+\epsilon)} \int_{\bar{D}((\varphi_r)_{z^j}(z), \frac{1}{3})} \mu(|\varphi_r(z + \epsilon)|) g^2(|\varphi_r(z + \epsilon)|) dv(z + \epsilon) \\
 &\leq c\epsilon \text{ when } |z| \leq 1/6 \text{ and } j > N.
 \end{aligned}$$

This shows that  $\{G_j(z)\}$  converges to 0 uniformly on  $\{z : |z| \leq 1/6\}$ . Thus,  $\{\nabla G_j(z)\}$  must converge to 0 uniformly on  $|z| \leq 1/12$ . In particular,

$$\lim_{j \rightarrow \infty} |\nabla G_j(0)| = 0. \quad (3.6)$$

On the other hand, by Lemma 2.14 and (2.11) in [3], we have

$$|\nabla G_j(0)|^2 = |\bar{\nabla} F_j(z^j)|^2 \geq (1 - |z^j|^2)^2 |RF_j(z^j)|^2. \quad (3.7)$$

(3.6) and (3.7) show that

$$\lim_{j \rightarrow \infty} (1 - |z^j|^2) |RF_j(z^j)| = 0. \quad (3.8)$$

By computation, we have

$$\begin{aligned}
 RF_j(z^j) &= \mu(|z^j|)g^{2'}(|\varphi_r(z^j)|^2) \langle R\varphi_r(z^j), \varphi_r(z^j) \rangle h^2(z^j) \\
 &+ \mu(|z^j|)g^2(|\varphi_r(z^j)|^2) Rh^2(z^j). \quad (3.9)
 \end{aligned}$$

By (3.3) and (3.8)–(3.9), and Lemma 2.5 and Lemma 2.2 in [11], we have

$$\begin{aligned} & \frac{(1 - |z^j|^2) \mu(|z^j|) |Rh^2(z^j)|}{\mu(|\varphi_r(z^j)|)} \\ &= \frac{1 - |z^j|^2}{\mu(|\varphi_r(z^j)|) g^2(|\varphi_r(z^j)|^2)} \mu(|z^j|) g^2(|\varphi_r(z^j)|^2) |Rh^2(z^j)| \\ &\leq c (1 - |z^j|^2) |RF_j(z^j)| + \frac{c' \mu(|z^j|) |h^2(z^j)|}{\mu(|\varphi_r(z^j)|)} \\ &\Rightarrow \lim_{j \rightarrow \infty} (1 - |z^j|^2) \mu(|z^j|) Rh^2(z^j) \mu(|\varphi_r(z^j)|) = 0. \end{aligned}$$

This means that

$$\lim_{|\varphi_r(z)| \rightarrow 1-} \frac{(1 - |z|^2) \mu(|z|) Rh^2(z)}{\mu(|\varphi_r(z)|)} = 0.$$

The proof is completed.

**Theorem 3.2.** Suppose  $\epsilon \geq 0$ , and  $\mu$  is a normal function on  $[0, 1)$ ,  $v(1 - \epsilon) = (2\epsilon - \epsilon^2)^2 \mu(1 - \epsilon)$  for  $0 < \epsilon < 1$ . If  $\varphi_r$  is a holomorphic self-map of  $B$  and  $\psi_r \in H(B)$ , then

(1)  $T_{\varphi_r, \psi_r}$  is bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  if and only if

$$M_0 = \sup_{z \in B} \left\{ |\psi_r(z)| \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} \right\} < \infty; \quad (3.10)$$

(2)  $T_{\varphi_r, \psi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  if and only if  $\psi_r \in \beta_v$  when  $\|\varphi_r\|_\infty < 1$ ;

(3)  $T_{\varphi_r, \psi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$  if and only if  $\psi_r \in \beta_v$  and

$$\lim_{|\varphi_r(z)| \rightarrow 1-} \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} = 0 \quad (3.11)$$

when  $\|\varphi_r\|_\infty = 1$ .

**Proof.** (1) For any  $f^2 \in A^{1+\epsilon}(\mu)$ , by Lemma 2.2 in [10], we have

$$|f^2(z)| \leq \frac{c \|f^2\|_{A^{1+\epsilon}(\mu)}}{(1 - |z|^2) \mu(|z|)} \quad (z \in B). \quad (3.12)$$



If (3.10) holds, then we take  $\epsilon = 1, h^2 = T_{\varphi_r, \psi_r}(f^2)$  and the normal function  $(2\epsilon - \epsilon^2) \mu(1 - \epsilon)$  in Theorem 3.1. By Lemma 2.2 in [11] and (3.12), for any  $z \in B$ , we have

$$\begin{aligned} & (1 - |z|^2)^2 \mu(|z|) |R[T_{\varphi_r, \psi_r}(f^2)](z)| \\ & \leq c' \sup_{z+\epsilon \in B} (1 - |z + \epsilon|^2) \mu(|z + \epsilon|) |T_{\varphi_r, \psi_r}(f^2)(z + \epsilon)| \\ & \leq c'' \sup_{z+\epsilon \in B} \left\{ \frac{|\psi_r(z + \epsilon)| \mu(|z + \epsilon|)}{\mu(|\varphi_r(z + \epsilon)|)} \left( \frac{1 - |z + \epsilon|^2}{1 - |\varphi_r(z + \epsilon)|^2} \right) \right\} \|f^2\|_{A^{1+\epsilon}(\mu)} \\ & \leq c'' M_0 \|f^2\|_{A^{1+\epsilon}(\mu)}. \end{aligned} \tag{3.13}$$

By (3.12)–(3.13) and Lemma 2.1, then  $T_{\varphi_r, \psi_r}$  is bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$ . Conversely, if  $T_{\varphi_r, \psi_r}$  is bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$ , then, for any  $(z + \epsilon) \in B$ , we take

$$f_{z+\epsilon}^2(z) = \frac{(1 - |\varphi_r(z + \epsilon)|^2)^{\frac{3}{2}+2\epsilon}}{\mu(|\varphi_r(z + \epsilon)|)(1 - \langle z, \varphi_r(z + \epsilon) \rangle)^{\frac{5}{2}+2\epsilon}}.$$

By the definition of normal function, we have

$$\begin{aligned} \mu^{1+\epsilon}(|z|) & \leq \frac{\mu^{1+\epsilon}(|\varphi_r(z + \epsilon)|)(1 - |z|^2)^{\frac{1}{2}+\frac{5}{2}\epsilon+2\epsilon^2}}{(1 - |\varphi_r(z + \epsilon)|^2)^{\frac{1}{2}+\frac{5}{2}\epsilon+2\epsilon^2}} \\ & + \frac{\mu^{1+\epsilon}(|\varphi_r(z + \epsilon)|)(1 - |z|^2)^{\frac{1}{2}+\frac{3}{2}\epsilon+\epsilon^2}}{(1 - |\varphi_r(z + \epsilon)|^2)^{\frac{1}{2}+\frac{3}{2}\epsilon+\epsilon^2}}. \end{aligned} \tag{3.14}$$

By Proposition 1.4.10 in [12] and (3.14), we obtain

$$\begin{aligned} & \|f_{z+\epsilon}^2\|_{A^{1+\epsilon}(\mu)}^{1+\epsilon} \\ & = \frac{(1 - |\varphi_r(z + \epsilon)|^2)^{\frac{3}{2}+\frac{7}{2}\epsilon+2\epsilon^2}}{\mu^{1+\epsilon}(|\varphi_r(z + \epsilon)|)} \int_B \frac{\mu^{1+\epsilon}(|z|)}{(1 - |z|^2) |1 - \langle z, \varphi_r(z + \epsilon) \rangle|^{\frac{5}{2}+\frac{9}{2}\epsilon+2\epsilon^2}} dv(z) \\ & \leq (1 - |\varphi_r(z + \epsilon)|^2)^{1+\epsilon} \int_B \frac{(1 - |z|^2)^{-\frac{1}{2}+\frac{5}{2}\epsilon+2\epsilon^2}}{|1 - \langle z, \varphi_r(z + \epsilon) \rangle|^{\frac{5}{2}+\frac{9}{2}\epsilon+2\epsilon^2}} dv(z) \\ & + (1 - |\varphi_r(z + \epsilon)|^2)^{\frac{3}{2}+\frac{7}{2}\epsilon+2\epsilon^2} \int_B \frac{(1 - |z|^2)^{-\frac{1}{2}+\frac{5}{2}\epsilon+2\epsilon^2}}{|1 - \langle z, \varphi_r(z + \epsilon) \rangle|^{\frac{5}{2}+\frac{9}{2}\epsilon+2\epsilon^2}} dv(z) \leq c. \end{aligned}$$

On the other hand, by Lemma 2.2 in [2] and Lemma 2.1, taking  $\epsilon = 0$ , we have

$$\begin{aligned}
 |T_{\varphi_r, \psi_r}(f_{z+\epsilon}^2)(z + \epsilon)| &\leq c \left( 1 + \int_0^{|z+\epsilon|} \frac{1}{v(1+\epsilon)} d(1+\epsilon) \right) \|T_{\varphi_r, \psi_r}(f_{z+\epsilon}^2)\|_{(\epsilon-1)_v} \\
 &\Rightarrow \frac{|\psi_r(z + \epsilon)|\mu(|z + \epsilon|)}{\mu(|\varphi_r(z + \epsilon)|)} \left( \frac{1 - |z + \epsilon|^2}{1 - |\varphi_r(z + \epsilon)|^2} \right) \\
 &\leq c' (1 - |z + \epsilon|^2) \mu(|z + \epsilon|) \left( 1 + \int_0^{|z+\epsilon|} \frac{1}{v(1+\epsilon)} d(1+\epsilon) \right) \|T_{\varphi_r, \psi_r}\| \\
 &\leq c' \mu(0) \|T_{\varphi_r, \psi_r}\| \\
 &+ c' \|T_{\varphi_r, \psi_r}\| (1 - |z + \epsilon|^2) \int_0^{|z+\epsilon|} \frac{\mu(|z + \epsilon|)}{(2\epsilon - \epsilon^2)^2 \mu(1 + \epsilon)} d(1 + \epsilon) \\
 &\leq c' \mu(0) \|T_{\varphi_r, \psi_r}\| + c' \|T_{\varphi_r, \psi_r}\| (1 - |z + \epsilon|^2) + \left(\frac{1}{2} + \epsilon\right) \int_0^{|z+\epsilon|} \frac{1}{(2\epsilon - \epsilon^2)^{\frac{5}{2} + \epsilon}} d(1 + \epsilon) \\
 &+ c' \|T_{\varphi_r, \psi_r}\| \left( 1 - |z + \epsilon|^2 \right)^{\frac{3}{2} + 2\epsilon} \int_0^{|z+\epsilon|} \frac{1}{(2\epsilon - \epsilon^2)^{\frac{5}{2} + 2\epsilon}} d(1 + \epsilon) \\
 &\leq c' \mu(0) \|T_{\varphi_r, \psi_r}\| + c'' \|T_{\varphi_r, \psi_r}\|.
 \end{aligned}$$

This shows that (3.10) holds.

(2)–(3) If  $T_{\varphi_r, \psi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_v$ , then  $\psi_r \in \beta_v$  by taking  $f^2(z) = 1$ . When  $\|\varphi_r\|_\infty = 1$ , we prove that (3.11) holds.

Let  $\{z^j\} \subset B$  be any sequence satisfying  $|\varphi_r(z^j)| \rightarrow 1$  ( $j \rightarrow \infty$ ). We take

$$f_j^2(z) = \frac{\left(1 - |\varphi_r(z^j)|^2\right)^{\frac{3}{2} + 2\epsilon}}{\mu(|\varphi_r(z^j)|)(1 - \langle z, \varphi_r(z^j) \rangle)^{\frac{5}{2} + 2\epsilon}}.$$

Then,  $\|f_j^2\|_{A^{1+\epsilon(\mu)}} \leq c$  and  $\{f_j^2(z)\}$  converges to 0 uniformly on any compact subset of  $B$ . This means that

$$\lim_{j \rightarrow \infty} \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_v} = 0.$$

On the other hand, we have

$$\begin{aligned} |T_{\varphi_r, \psi_r}(f_j^2)(z^j)| &\leq c \left( 1 + \int_0^{|z^j|} \frac{1}{v(1+\epsilon)} d(1+\epsilon) \right) \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_v} \\ &\Rightarrow \frac{|\psi_r(z^j)|\mu(|z^j|)}{\mu(|\varphi_r(z^j)|)} \left( \frac{1 - |z^j|^2}{1 - |\varphi_r(z^j)|^2} \right) \\ &\leq c(1 - |z^j|^2) \mu(|z^j|) \left( 1 + \int_0^{|z^j|} \frac{1}{v(1+\epsilon)} d(1+\epsilon) \right) \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_v} \\ &\leq c\mu(0)\|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_v} + c' \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_v}. \end{aligned}$$

This shows that

$$\lim_{j \rightarrow \infty} \frac{|\psi_r(z^j)|\mu(|z^j|)}{\mu(|\varphi_r(z^j)|)} \left( \frac{1 - |z^j|^2}{1 - |\varphi_r(z^j)|^2} \right) = 0.$$

This means that (3.11) holds.

Conversely, for all  $l \in \{1, 2, \dots, 1 + \epsilon\}$ , we have  $(\varphi_r)_l \in H^\infty \subset \epsilon - 1$ . This means that  $(1 - |z|^2)|R(\varphi_r)_l(z)| \leq \|(\varphi_r)_l\|_{\epsilon-1}$  holds for all  $z \in B$ .

Let  $\{f_j^2(z)\}$  be any sequence which converges to 0 uniformly on any compact subset of  $B$  and  $\|f_j^2\|_{A^{1+\epsilon(\mu)}} \leq 1$ . When  $\|\varphi_r\|_\infty < 1$ , we know that  $\{|\nabla f_j^2(z + \epsilon)|\}$  converges to 0 uniformly on  $\{z + \epsilon : |z + \epsilon| \leq \|\varphi_r\|_\infty\}$  and  $\{f_j^2(\varphi_r(0))\}$  converges to 0. If  $\psi_r \in \beta_v$ , by Lemma 2.1, Lemma 2.2 in [2], then



$$\begin{aligned}
 \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_\nu} &\leq |\psi_r(0)| \cdot |f_j^2[\varphi_r(0)]| + c' \sup_{z \in B} \nu(|z|) |R[T_{\varphi_r, \psi_r}(f_j^2)](z)| \\
 &\leq |\psi_r(0)| \cdot |f_j^2[\varphi_r(0)]| + c' \sup_{z \in B} \nu(|z|) |R\psi_r(z)| \cdot |f_j^2[\varphi_r(z)]| \\
 &\quad + c' \sup_{z \in B} \nu(|z|) |\psi_r(z)| \cdot |\langle \nabla f_j^2[\varphi_r(z)], R\varphi_r(z) \rangle| \\
 &\leq |\psi_r(0)| \cdot |f_j^2[\varphi_r(0)]| + c' \|\psi_r\|_{\beta_\nu} \sup_{|z+\epsilon| \leq \|\varphi_r\|_\infty} |f_j^2(z+\epsilon)| \\
 &\quad + (c''\mu(0) \\
 &\quad + c''') \|\psi_r\|_{\beta_\nu} \left( \sum_{l=1}^{1+\epsilon} \|\varphi_{r_l}\|_\beta \right) \sup_{|z+\epsilon| \leq \|\varphi_r\|_\infty} |\nabla f_j^2(z+\epsilon)| \\
 &\rightarrow 0 \quad (j \rightarrow \infty).
 \end{aligned}$$

When  $\|\varphi_r\|_\infty = 1$ , if (3.11) holds, then we take the normal function  $(2\epsilon - \epsilon^2) \mu(1 - \epsilon)$  and  $h^2 = \psi_r$  in Theorem 3.1. This means that

$$\lim_{|\varphi_r(z)| \rightarrow 1^-} |R\psi_r(z)| \frac{(1 - |z|^2)^2}{(1 - |\varphi_r(z)|^2)^2} \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} = 0.$$

Therefore, for any  $\epsilon > 0$ , there exists  $0 < \delta < 1$  such that

$$|\psi_r(z)| \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} < \epsilon \quad \text{and} \quad \frac{|R\psi_r(z)|(1 - |z|^2)^2}{(1 - |\varphi_r(z)|^2)^2} \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} < \epsilon \quad (3.15)$$

when  $|\varphi_r(z)| > \delta$ . As  $\{f_j^2(z)\}$  converges to 0 uniformly on any compact subset of  $B$ , then  $\{|\nabla f_j^2(z + \epsilon)|\}$  converges to 0 uniformly on  $\{z + \epsilon : |z + \epsilon| \leq \delta\}$  and  $\{f_j^2(\varphi_r(0))\}$  converges to 0. Therefore, there exists positive integer  $N$  such that

$$\begin{aligned}
 \sup_{|z+\epsilon| \leq \delta} |f_j^2(z + \epsilon)| < \epsilon, \quad \sup_{|z+\epsilon| \leq \delta} |\nabla f_j^2(z + \epsilon)| < \epsilon, \\
 \text{and } |f_j^2(\varphi_r(0))| < \epsilon \text{ when } j > N.
 \end{aligned}$$

When  $|\varphi_r(z)| \leq \delta$  and  $j > N$ , we have

$$\begin{aligned}
 \nu(|z|) |R[T_{\varphi_r, \psi_r}(f_j^2)](z)| &\leq \|\psi_r\|_{\beta_\nu} \sup_{|z+\epsilon| \leq \delta} |f_j^2(z + \epsilon)| \\
 &\quad + (c'\mu(0) + c'') \|\psi_r\|_{\beta_\nu} \left( \sum_{l=1}^{1+\epsilon} \|\varphi_{r_l}\|_\beta \right) \sup_{|z+\epsilon| \leq \delta} |\nabla f_j^2(z + \epsilon)| \\
 &< c\epsilon. \quad (3.16)
 \end{aligned}$$

If  $j > N$ , by Lemma 2.1–2.2, (3.12), (3.15)–(3.16), and  $H_{\varphi_r(z)} [R\varphi_r(z)] \leq cH_z(z)$ , then

$$\begin{aligned} & \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_\nu} \\ & \leq |\psi_r(0)| \cdot |f_j^2(\varphi_r(0))| \\ & \quad + c' \left( \sup_{|\varphi_r(z)| > \delta} + \sup_{|\varphi_r(z)| \leq \delta} \right) \nu(|z|) |R[T_{\varphi_r, \psi_r}(f_j^2)](z)| \\ & < c''\varepsilon + c'\varepsilon \sup_{|\varphi_r(z)| > \delta} \frac{(1 - |\varphi_r(z)|^2)^2 \mu(|\varphi_r(z)|) |\langle \nabla f_j^2[\varphi_r(z)], \overline{R\varphi_r(z)} \rangle| (1 - |z|^2)}{\sqrt{(1 - |\varphi_r(z)|^2) |R\varphi_r(z)|^2 + |\langle R\varphi_r(z), \varphi_r(z) \rangle|^2}} \sqrt{H_{\varphi_r(z)} [R\varphi_r(z)]} \\ & < c''\varepsilon + c'''\varepsilon \|f_j^2\|_{\beta_\nu} \leq c''\varepsilon + c\varepsilon \|f_j^2\|_{A^{1+\varepsilon}(\mu)} \leq c''\varepsilon + c\varepsilon. \end{aligned}$$

This shows that

$$\lim_{j \rightarrow \infty} \|T_{\varphi_r, \psi_r}(f_j^2)\|_{\beta_\nu} = 0.$$

This means that  $T_{\varphi_r, \psi_r}$  is compact from  $A^{1+\varepsilon}(\mu)$  to  $\beta_\nu$ . The proof is completed.

**Remark.** From Lemma 2.2 we have

$$\nu(|z|) |Rf^2(z)| \leq \frac{c''}{c} \|f^2\|_{\beta_\nu},$$

and Theorem 3.2, eqn (3.12) we can find that

$$(1 - |z|^2) \mu(|z|) \|z^2\| \geq 1.$$

Hence

$$|Rf^2(z)| \leq \frac{c''}{c} \frac{\|f^2\|_{\beta_\nu}}{\mu(|z|) \nu(|z|) (1 - |z|^2) \|z^2\|}$$

**Corollary 3.3.** Suppose  $\varepsilon \geq 0$ , and  $\mu$  is a normal function on  $[0, 1)$ ,  $\nu(1 - \varepsilon) = (2\varepsilon - \varepsilon^2)^2 \mu(1 - \varepsilon)$  for  $0 < \varepsilon < 1$ . If  $\varphi_r$  is a automorphism of  $B$  and  $\psi_r \in H(B)$ , then

- (1)  $T_{\varphi_r, \psi_r}$  is bounded from  $A^{1+\varepsilon}(\mu)$  to  $\beta_\nu$  if and only if  $\psi_r \in H^\infty$ ;
- (2)  $T_{\varphi_r, \psi_r}$  is compact from  $A^{1+\varepsilon}(\mu)$  to  $\beta_\nu$  if and only if  $\psi_r \equiv 0$ .

**Proof.** By Lemma 2.2 in [11], Lemma 2.4, there exists constant  $c > 0$  such that

$$\frac{1}{c} \leq \left\{ \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right\} \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} \leq c. \tag{3.17}$$

On the other hand, if  $\varphi_r$  is a automorphism of  $B$ , then  $|\varphi_r(z)| \rightarrow 1^-$  if and only if  $|z| \rightarrow 1^-$ . Therefore, by (3.17), Theorem 3.2, and the Maximum Modulus Principle, we can obtain the result.

**Corollary 3.4.** Suppose  $\epsilon \geq 0$ , and  $\mu$  is a normal function on  $[0, 1)$ ,  $\nu(1 - \epsilon) = (2\epsilon - \epsilon^2)^2 \mu(1 - \epsilon)$  for  $0 < \epsilon < 1$ . If  $\varphi_r$  is a holomorphic self-map of  $B$ , then

- (1)  $C_{\varphi_r}$  is always bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$  ;
- (2)  $C_{\varphi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$  if and only if

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0. \tag{3.18}$$

**Proof.** (1) By Lemma 2.2 in [11], we have

$$\begin{aligned} \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} &\leq \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+\epsilon} + \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+2\epsilon} \\ &\leq \left( \frac{1 + |\varphi_r(0)|}{1 - |\varphi_r(0)|} \right)^{\frac{3}{2}+\epsilon} + \left( \frac{1 + |\varphi_r(0)|}{1 - |\varphi_r(0)|} \right)^{\frac{3}{2}+2\epsilon}. \end{aligned}$$

By Theorem 3.2,  $C_{\varphi_r}$  is always bounded from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$ .

(2) If (3.18) holds and  $\|\varphi_r\|_\infty = 1$ , then we have

$$\begin{aligned} \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} &\leq \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+\epsilon} + \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+2\epsilon} \quad (|\varphi_r(z)| \rightarrow 1^-). \end{aligned}$$

By Theorem 3.2,  $C_{\varphi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$ .

Conversely, if  $C_{\varphi_r}$  is compact from  $A^{1+\epsilon}(\mu)$  to  $\beta_\nu$  and  $\|\varphi_r\|_\infty = 1$ , then, by Theorem 3.2, we have



$$0 \leftarrow \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right) \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} \geq \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+2\epsilon} \left\{ 1 + \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^\epsilon \right\}^{-1}$$

$$\geq \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{\frac{3}{2}+2\epsilon} \left\{ 1 + \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^\epsilon \right\}^{-1} \quad (|\varphi_r(z)| \rightarrow 1^-).$$

This shows that

$$\lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

Therefore, for any  $\epsilon > 0$ , there exists  $0 < \delta < 1$  such that  $\frac{1-|z|^2}{1-|\varphi_r(z)|^2} < \epsilon$  when  $|\varphi_r(z)| > \delta$ . On the other hand,

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - \delta^2} = 0,$$

then there exists  $0 < \delta_0 < 1$  such that  $\frac{1-|z|^2}{1-\delta^2} < \epsilon$  when  $|z| > \delta_0$ . When  $|z| > \delta_0$ , if  $|\varphi_r(z)| \leq \delta$ , then

$$\frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \leq \frac{1 - |z|^2}{1 - \delta^2} < \epsilon; \text{ if } |\varphi_r(z)| > \delta, \text{ then } \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} < \epsilon.$$

This shows that

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

The proof is completed.

This is Proposition C.

**Theorem 3.5.** Let  $\mu$  be normal on  $[0, 1)$ , and  $\varphi_r$  be a holomorphic self- map of  $B$ . If  $\epsilon > 0$ , then  $C_{\varphi_r}$  is compact on  $\beta_\mu$  if and only if

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

**Proof** First, suppose that  $C_{\varphi_r}$  is compact on  $\beta_\mu$ . If  $\|\varphi_r\|_\infty < 1$ , then we have

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

When  $\|\varphi_r\|_\infty = 1$ , let  $\{z^j\} \subset B$  be any sequence satisfying

$$\lim_{j \rightarrow \infty} |\varphi_r(z^j)| = 1.$$

We take  $f_j^2(z) = (1 - |\varphi_r(z^j)|^2) g^2(\langle z, \varphi_r(z^j) \rangle)$ , where  $g^2$  is the function in Lemma 2.5. By Lemma 2.5, we have

$$\begin{aligned} \mu(|z|) |\nabla f_j^2(z)| &= \mu(|z|) (1 - |\varphi_r(z^j)|^2) \left| g^{2'}(\langle z, \varphi_r(z^j) \rangle) \overline{\varphi_r(z^j)} \right| \\ &\leq 2\mu(\langle z, \varphi_r(z^j) \rangle) (1 - |\langle z, \varphi_r(z^j) \rangle|) g^{2'}(|\langle z, \varphi_r(z^j) \rangle|) \leq c. \end{aligned}$$

Therefore,  $\|f_j^2\|_{\beta_\mu} \leq 1 + c$  and  $\{f_j^2(z)\}$  converges to 0 uniformly on any compact subset of  $B$ . This means that

$$\lim_{j \rightarrow \infty} \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} = 0.$$

On the other hand, by Lemma 2.5, Lemma 2.1, Lemma 2.2 in [2], and Lemma 2.2 in [11], we have

$$\begin{aligned} 0 < c &\leq \mu(|\varphi_r(z^j)|^2) g^2(|\varphi_r(z^j)|^2) = \frac{\mu(|\varphi_r(z^j)|^2) |C_{\varphi_r}(f_j^2)(z^j)|}{1 - |\varphi_r(z^j)|^2} \\ &\leq \frac{c' \mu(|\varphi_r(z^j)|^2)}{1 - |\varphi_r(z^j)|^2} \left( 1 + \int_0^{|\varphi_r(z^j)|} \frac{1}{\mu(1 + \epsilon)} d(1 + \epsilon) \right) \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} \\ &\leq \left\{ c' \mu(0) (1 - |\varphi_r(z^j)|^4)^\epsilon + \frac{c'' (1 - |\varphi_r(z^j)|^2)^\epsilon}{(1 - |z^j|^2)^\epsilon} \right. \\ &\quad \left. + \frac{c'' (1 - |\varphi_r(z^j)|^2)^{2\epsilon}}{(1 - |z^j|^2)^{2\epsilon}} \right\} \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} \Rightarrow \left( \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} \right)^{2\epsilon} \\ &\leq \frac{1}{c} \left\{ \frac{c''' (1 - |\varphi_r(z^j)|^2)^{2\epsilon}}{(1 - |\varphi_r(z^j)|^2)^\epsilon} + \frac{c''' (1 - |\varphi_r(z^j)|^2)^\epsilon}{(1 - |\varphi_r(z^j)|^2)^\epsilon} + c'' \right\} \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} \\ &\leq \frac{1}{c} \left\{ \frac{c''' (1 + |\varphi_r(0)|)^\epsilon}{(1 - |\varphi_r(0)|)^\epsilon} + \frac{c'' (1 + |\varphi_r(0)|)^\epsilon}{(1 - |\varphi_r(0)|)^\epsilon} + c'' \right\} \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu}. \end{aligned}$$

By  $\epsilon > 1$ , this shows that

$$\lim_{j \rightarrow \infty} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0 \Rightarrow \lim_{|\varphi_r(z)| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0.$$

By Proof of Corollary 3.3, we have  $\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0$ .

Conversely, first, for all  $l \in \{1, \dots, 1 + \epsilon\}$ , we have  $(\varphi_r)_l \in \beta_\mu$  when  $\epsilon > 0$ . If

$$\lim_{|z| \rightarrow 1^-} \frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} = 0,$$

then for any  $0 < \epsilon < 1$ , we have

$$\frac{1 - |z|^2}{1 - |\varphi_r(z)|^2} < \epsilon \text{ when } 1 - \epsilon < |z| < 1. \quad (3.19)$$

Let  $\{f_j^2(z)\}$  be any sequence that converges to 0 uniformly on any compact subset of  $B$  and  $\|f_j^2\|_{\beta_\mu} \leq 1$ . Let  $r_1 = \max\{|\varphi_r(z)| : |z| \leq 1 - \epsilon\}$ . Then, there exists positive integer  $N$  such that

$$|f_j^2[\varphi_r(0)]| < \epsilon \text{ and } \sup_{|z+\epsilon| \leq r_1} |\nabla f_j^2(z+\epsilon)| < \epsilon \text{ when } j > N. \quad (3.20)$$

Therefore, by Lemma 2.1 and  $H_{\varphi_r(z)}[R\varphi_r(z)] \leq cH_z(z)$ , (3.19)–(3.20), Lemma 2.2 in [11], as long as  $j > N$ , we have



$$\begin{aligned}
 \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} &\leq c \left\{ |f_j^2[\varphi_r(0)]| + \sup_{z \in B} \mu(|z|) |\langle \nabla f_j^2[\varphi_r(z)], R\varphi_r(z) \rangle| \right\} \\
 &\leq c |f_j^2[\varphi_r(0)]| \\
 &\quad + c \left\{ \left( \sum_{l=1}^{1+\epsilon} \|(\varphi_r)_l\|_{\beta_\mu} \right) \sup_{|z+\epsilon| \leq r_1} |\nabla f_j^2(z+\epsilon)| \right. \\
 &\quad \left. + \|f_j^2\|_{\mu,3} \sup_{1-\epsilon < |z| < 1} \frac{\mu(|z|)(1-|\varphi_r(z)|^2) \sqrt{H_{\varphi_r(z)}[R\varphi_r(z)]}}{\mu(|\varphi_r(z)|)} \right\} \\
 &\leq c'\epsilon + c'' \sup_{1-\epsilon < |z| < 1} \frac{\mu(|z|)}{\mu(|\varphi_r(z)|)} \frac{1-|\varphi_r(z)|^2}{1-|z|^2} \\
 &\leq c'\epsilon + c'' \sup_{1-\epsilon < |z| < 1} \left\{ \left( \frac{1-|z|^2}{1-|\varphi_r(z)|^2} \right)^\epsilon + \left( \frac{1-|z|^2}{1-|\varphi_r(z)|^2} \right)^{2\epsilon} \right\} \\
 &< c'\epsilon + 2c''\epsilon^\epsilon.
 \end{aligned}$$

This shows that

$$\lim_{j \rightarrow \infty} \|C_{\varphi_r}(f_j^2)\|_{\beta_\mu} = 0.$$

This implies that  $C_{\varphi_r}$  is compact on  $\beta_\mu$ .

The proof is completed.

This is Proposition E.

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## ***The impact of cloud accounting on the quality of accounting information***

*An applied study in a sample of Iraqi public shareholding companies*

***Gufran Nadhum Trat***

*/ Ministry of Finance / General Authority for Taxes / Iraq*

### ***Summary:***

*The presence of many web applications in various fields of accounting is one of the most important uses, as the use of electronic systems represents one of the important means of modern means of information that is increasingly being used by institutions, companies, and all different economic units in general, and accounting information systems, especially technologies, is one of the most important developments of the Internet's impact on the system. Accounting information. Therefore, the research aimed mainly to identify the impact of cloud accounting on the quality of accounting information in Iraqi public shareholding companies. The measurement tool (questionnaire) was used for the purpose of testing the effect of variables.*

*The results of the research were that cloud accounting is considered one of the modern technologies based on cloud computing that helps those in charge of the system. Accounting information in performing their work easily. Cloud accounting also helps organizations reduce costs and benefit from many advantages, but this is accompanied by many possible risks that must be taken into consideration. Therefore, it has become necessary to draw companies' attention to the advantages of cloud accounting in the long term and limit it to short-term judgment. On its ineffectiveness and comparison with traditional systems.*

***Keywords:*** *cloud accounting, quality of accounting information*



## **Introduction :**

Cloud accounting represents a new technology trend, because it represents the basic environment and platform for providing secure data storage and convenient Internet services in the future, as well as the huge power of cloud accounting that seriously affects company information, reporting and general work.

Because the quality of accounting information is considered a vital element and an important basis in evaluating the performance of companies and an important tool in drawing up its policies and making future decisions, especially with regard to decisions to invest in securities, especially if this information is prepared in accordance with local or international principles and standards, which gives it quality and effectiveness in its use.

Therefore, the application of cloud accounting in the field of accounting through the use of an accounting program is the addition of a third party on the Internet to collect the information contained in it into accounts and statements, which was not known in the past and is a major matter, as it can be considered a leap in information and technology. Companies seek to build information systems and use modern technologies represented in cloud accounting to help them manage and store large amounts of information and business, which in turn depends on the principles and foundations represented by international financial reporting standards.

## **The first topic :**

### **General framework of the research:**

#### **1-1 Research problem:**

Cloud accounting is still in the research and development stage, and its success in enhancing its presence and gaining the trust of beneficiaries represents a revolution in the field of the computer and software industry. In light of these rapid developments, companies in general face many problems in storing large amounts of data, in addition to the development of accounting and its techniques

and its transformation into new forms, the most important of which is cloud accounting, which depends on transferring the processed information and computer storage space to the so-called cloud, through the Internet. Adopting this technology requires preparation and preparation for its application, and the necessity of developing international financial reports in line with cloud accounting applications and their risks in order to ensure the preservation of the quality and credibility of financial reports and the information they contain.

Hence, the following main question can be formulated: *Is there an impact of cloud accounting on the quality of accounting information?*

The following sub-questions branch out from the main question:

- 1- *Is there an impact of using cloud accounting on the suitability of accounting information in Iraqi joint stock companies?*
- 2- *Is there an impact on the objectivity of accounting information in Iraqi public shareholding companies?*
- 3- *Is there an impact of using cloud accounting on the appropriate timeliness of accounting information in Iraqi joint stock companies?*

### **1-2: Importance of research:**

This study derives its importance from the importance of the topic it addresses, which is revealing the latest second-generation web technologies, which is cloud accounting, as it is considered one of the topics that has spread recently, and this topic is considered among the issues that are affecting companies, which are required to respond to them and keep pace with development. Progress and keeping pace with modern technologies. The importance of this study is also represented by the set of expected additions it presents, which can benefit researchers in the academic field and practitioners in practice, which are (identifying a new concept known as cloud accounting, shedding light on the latest second-generation web technologies (cloud accounting). What this technology can provide is knowledge of the role that cloud accounting plays in the quality of accounting information and ways to benefit from it.)



### **1-3: Objectives of the study:**

The study mainly aims to identify the impact of cloud accounting on the quality of accounting information in Iraqi public shareholding companies. The study seeks to achieve the following objectives:

- 1- Identify the concept of cloud accounting and present its advantages.
- 2- Identify the impact of using cloud accounting on the objectivity, suitability, and timeliness of information in Iraqi public shareholding companies.

### **1-4: Research hypotheses:**

In light of the research or study problem and its questions, the following hypotheses can be formulated:

*Main hypothesis H<sub>0</sub>: There is no statistically significant effect at the level of statistical significance for cloud accounting on the quality of accounting information in Iraqi public shareholding companies.*

*The following sub-hypotheses emerge from the main hypothesis:*

*H<sub>01</sub>: There is no statistically significant effect at the level of statistical significance for cloud accounting on the suitability of accounting information in Iraqi public shareholding companies.*

*H<sub>02</sub>: There is no statistically significant effect at the level of statistical significance for cloud accounting on the objectivity of accounting information in Iraqi public shareholding companies.*

*H<sub>03</sub>: There is no statistically significant effect at the level of statistical significance for cloud accounting on the timeliness of accounting information in Iraqi public shareholding companies.*

### **The second topic: Theoretical framework of the research:**

#### **2-1 The concept of cloud accounting:**



**2-1-1: Definition of cloud accounting:** *The topic of cloud accounting has received the attention of many researchers, experts, as well as organizations, and its definitions have varied. (Abdullah.2017:13) explained that it is “the process of storing data and programs and accessing them over the Internet instead of on a hard drive, as “The cloud is just a metaphor for the Internet. It goes back to the days of flowcharts and presentations that would represent the massive computer server infrastructure of the Internet as just a white cloud, accepting connections and distributing information even as it floated.”*

*As for (Ashok.2018:51), he referred to cloud accounting as “a set of accounting information and data with shared resources that rely on the Internet in terms of storage and applications so that they can be easily accessed by the service provider.”*

*While (Amron & Roslina, 2019:19) expressed it as “it is a computerized system that collects, records, and stores financial data in an electronic cloud within the Internet, and processes it to produce information for decision makers. It includes users, procedures, data, instructions, software, information technology infrastructure, and internal controls.” And security measures.*

*In the current research, cloud accounting can be defined as a set of accounting programs and an information system for financial and administrative data placed or stored within an electronic cloud, which specializes in collecting, arranging, processing and analyzing appropriate financial information through relevant accounting applications and then communicating it to the relevant parties, to take Appropriate decisions.*

**2-1-2: The importance of cloud accounting:**

*Moving accounting from the desktop to the cloud has been a huge leap forward in financial management, while removing many of the drawbacks and cost implications of traditional accounting from the equation. Cloud accounting adds great importance in the main areas in which the cloud accounting system adds real and tangible value, including (Ghosh, 2015: 15):*

1- Cloud accounting provides access to your accounts anywhere: through it, key business numbers can be accessed 24 hours a day, 7 days a week, eliminating the need to work from one central computer in the office.

2- Availability of access to real-time information: By updating the company's bookkeeping and bank reconciliation, you can achieve real-time reporting. This real-time overview is vital when looking at a company's financial health, planning future spending, and when making financial and strategic decisions.

3- It works to access the application ecosystem: Open application programming interfaces mean that through cloud accounting, a group of third-party applications and tools can be added to expand the basic business system. For example, adding cash flow forecasting applications, online invoicing applications, and the company's project management tools. And a host of other practical solutions to choose from. These tools save more time, reduce resource costs and identify problems in advance. (Huang, N, 2016: 14)

4- Provides the feature of viewing bank accounts: Many cloud accounting platforms provide a direct summary of your bank accounts, giving the ability to link the company's bank account directly to the manager's account. Instead of manually entering each bank statement line, this speeds up bank reconciliation while giving a more accurate view of the bank balance.

5- Secure data exchange: It gives the user easy access to accounts using its own programs and applications. Without the need for USB sticks or sending emails back and forth, it gives advisors secure access to all your financial information in real time. Making it faster and safer. (Mahalakshmi, 2017: 5)

**2-1-3: Types of cloud accounting programs:** There are four types of cloud accounting programs (Al-Shamrani, 2019, 255):

1. Private cloud: The cloud infrastructure is managed and operated for only one organization, so that a consistent level of control over security, privacy, and



governance can be maintained. It is also known as the internal cloud. The private cloud may be managed by the company or a third party.

2. *Public cloud:* The infrastructure for this type of cloud is based on being available to the general public, and is owned by the company that sells cloud services. It is also known as external cloud or multi-cloud.

3. *Community cloud:* It is referred to as special-purpose cloud computing for shared environments \* as it is managed by a number of related organizations or companies participating in a common field. Community clouds may be managed by organizations or a third party.

4. *Hybrid cloud:* The infrastructure of this cloud is made up of two or more distinct cloud infrastructures (private, community, or public), but they are connected to each other by a unified technology to enable data transfer, which provides the benefits of multiple deployment. There are also many types of accounting software: (Shenawa and Al-Shammari, 2019: 7)

**2-1-4: Obstacles to applying digital accounting:** Despite the advantages and benefits achieved by using digital accounting, there are a group of obstacles to its application, the most important of which are the following: (3, 2016, Nurhajati, Y.)

1-The need for large storage spaces.

2- Maintaining the security and confidentiality of customer data.

3- Availability of appropriate applications for all institutions and their economic feasibility

4- Provides comprehensive coverage for fast Internet access.

5- Convincing executives and decision-makers of the feasibility of moving to digital accounting.

6- Complete reliance on other companies limits the technology used and reduces work flexibility for users.



## **2-2: The concept of quality of accounting information:**

### **2-2-1: Definition of accounting information quality:**

*The term quality refers to the set of distinctive characteristics of the product, activity, or process that make it meet the declared and expected needs or be able to meet them (ISO, 2017:9). The quality of accounting information is of great importance in determining the quality of reports that will be issued later based on accounting information, and therefore it must There should be rules and standards to rely on that determine the quality and nature of information in a way that makes it more useful. The quality of accounting information is a standard by which the extent to which accounting information achieves its objectives can be judged, as it can be used as a basis for comparison between accounting methods for the purpose of measuring and disclosing lists. The quality of information Accounting must have the criterion of utility, meaning the ability of information to meet the needs of a specific decision (Al-Sakani, 2010: 65)*

*The concept of quality of accounting information refers to the credibility of this information and the benefit it achieves for users, and that it is free from distortion, error, and misleading, and that it is prepared on the basis of a set of legal, regulatory, professional, and technical standards that help achieve the goal of its use (Ali Bey, 2013: 40).*

### **2-2-2: Characteristics of the quality of accounting information:**

*The characteristics of high-quality accounting information, or what is known as the qualitative characteristics of accounting information, are among the necessary matters that must be taken into consideration to judge its quality. Accounting information is considered the basic output of the accounting system, and these characteristics are what give the information its value and importance to the extent that it is characterized, as the quality cannot be imagined. Accounting information is provided to its users only in light of the availability of these characteristics, and it is not sufficient to prepare accounting information based on the foundations and rules included in accounting standards, regardless*

of its source, if it is not characterized by the characteristics of high-quality information (Al-Jaarat, 2012: 191). Qualitative characteristics refer to the qualities and advantages that It makes the information presented in the financial statements more useful to investors, lenders and other users in making economic decisions based on this information contained in the financial reports. The following are the characteristics mentioned by the common conceptual framework for financial accounting and reporting issued by the Financial Accounting Standards Board (FASB) and the Accounting Standards Board international,

17-19): 2010, FASB).

### **2-2-2: Standards for the quality of accounting information:**

The concept of quality of accounting information should be comprehensive and not limited to the availability of only one standard represented by qualitative characteristics such as a technical standard, neglecting other standards that are no less important and directly affect the achievement of the concept of quality of accounting information. Accordingly, legal, regulatory, and regulatory standards must be available. Professional and technical” (Rapina, 2014: 149). The most important of these standards that must be present in accounting information to judge its quality will be stated as follows:

1- Legal standards: Many professional organizations in many countries seek to develop standards for the quality of accounting information, and achieve compliance with them by enacting clear and regulating legislation and laws for the work of economic units while providing an effective organizational structure that controls the performance aspects of these units in accordance with legal requirements. Which obligates these units to adequately disclose them

(Sherif, 2015:58)

2- Oversight standards: The success of management and the activity of the economic unit depends on the presence of effective oversight that determines the role of each of the audit committees and financial and administrative oversight



bodies in organizing financial treatments to ensure that their policies and procedures are implemented properly and in accordance with the procedures of the accounting system and the control system.

The Ministry of Interior and that its financial statements are characterized by credibility (Jomaa and Nawal, 2011: 17)

3- Professional standards: Professional accounting bodies and councils are interested in preparing accounting and auditing standards to control the performance of the accounting and auditing process, which highlights the concept of holding management accountable by owners to ensure their investments, which in turn led to the emergence of the need to prepare financial reports that enjoy integrity and honesty (Bohafs, 2018: 146).

4- Technical standards: The availability of technical standards leads to developing the concept of quality accounting information, which in turn is reflected in the quality of financial reports and increases the confidence of shareholders, investors, stakeholders, and economic unity, and this leads to raising and increasing investment (Abbas, 2014: 15)

**The third topic: LPractical aspect:**

**3-1: Design the questionnaire form.**

In this study, a questionnaire form will be designed, which includes a number of paragraphs that express the impact of cloud accounting on the quality of accounting information, for the purpose of proving the research hypotheses, as it was prepared based on a review of the available scientific sources related to the topic of cloud accounting and the quality of accounting information. With the aim of identifying the most important points that affect the quality of accounting information, and giving suggestions and correcting deviations to achieve good accounting information in the future.



### **3-1-1: Research community and research sample:**

*In collecting data, the researcher used the questionnaire form, which is a tool to follow up on the research topic, through a series of examples related to the different axes of the research topic, with the aim of helping in analyzing and evaluating these axes. The aim is to record a number of effects related to specific events, whether desirable or undesirable, for any A process within a specific period of time, and facilitating the process of collecting and organizing data, to reduce the largest possible number of errors. The questionnaire form method is used to collect and record data, whether in the form of event numbers in a specific and fixed manner, as its scale is three, five, or seven, consisting of axes or levels. The questionnaire form relies on the use of a unified form to collect data over a certain period of time, which helps record data in a unified and organized manner, and facilitates making decisions based on objective data.*

### **3-1-2: Measuring the validity and reliability of the study questionnaire:**

*First: Validity of the tool: It means that the scale measures what it was designed to measure, and the validity of the tool was measured through content validity: The content validity of the questionnaire was verified by calculating Pearson correlation coefficients between each item of the study tool with the overall score for the section or field in which This paragraph belongs to the five-point Likert scale, using the statistical program (SPSS). Table (1) shows the values of the correlation coefficients for the total paragraphs of the sections.*

**Table (1): Matrix of the total values of Pearson correlation coefficients at the significance level of 0.005**

<b>Correlation coefficient</b>	<b>Interviewer</b>
<b>0.855</b>	<b>Cloud accounting</b>
<b>0.824</b>	<b>Quality of accounting information</b>

**Source: Prepared by the researcher based on the results of statistical analysis spss.v26**

It is noted from Table (1) that the total values of the correlation coefficients have risen to statistically significant levels between these items and the total score of the axis to which they belong, which indicates the high validity of the study tool used in achieving the goals for which it was developed.

**Second: Measuring the stability of the tool:**

Stability means that the measure is stable and does not contradict itself, which means that if the measure is re-applied to the same sample, the measure gives the same result with a probability equal to the value of the coefficient. To test and measure the stability of the research tools, the Cronbach Alpha\* reliability coefficient was used, using the internal consistency of the respondents' answers to the research tool items, and the results are shown in the table. (2)

**Table (2): shows the reliability coefficients**

<b>Cronbach's alpha reliability coefficient</b>	<b>Number of paragraphs</b>	<b>the field</b>
<b>0.778</b>	<b>5</b>	<b>Cloud accounting</b>
<b>0.893</b>	<b>5</b>	<b>Quality of accounting information</b>
<b>0.871</b>	<b>10</b>	<b>Total marks</b>

*Source: Prepared by the researcher based on the results of statistical analysis*

**3-2: Description and analysis of the research sample**

**First: General information about the sample**

The researcher randomly selected the research sample, and this sample included unit officials and a number of employees of private joint-stock companies in Baghdad, in Al-Mansour specifically, represented by (Al-Harir Exchange

Company, Al-Rayyan Company, and Al-Atheer Company), and the results were as follows:

**1- Gender:** The statistical results presented in Table (3) showed that the percentage of females in the sample was (48%) compared to (52%) for males. This shows that the numbers of employees in joint-stock companies are almost similar, and this is due to the companies in the research sample adopting fair principles in Employment of its workers, as shown in Table 3, shows these percentages.

**Table (3): Description of the research sample, gender**

Percentage	Repetition	Target sample	Variables
52%	39	Male	Gender
48%	36	Females	
100%	75	Total	

**Source:** Prepared by the researcher based on the questionnaire form.

**2- Description of the research sample according to length of service:** The statistical results presented in Table (4) showed that (52%) of the research sample members had a service range between (5-10 years). This sample represented the highest percentage, and then comes the group (More than 10 years), as the percentage of this category reached (32%), then the last category (from 1-5 years) with a percentage of (16%). It becomes clear that the joint-stock companies in the research sample have multiple experiences, and it is noted that the percentage is lower for those with little experience, due to The nature of work there...and Table No. (4) shows these percentages.

**Table No. (4): Description of the research sample according to length of service**

percentage	Repetition	Target sample	Variables
16%	12	From 1-5 years	Length of service
52%	39	From 5-10 years	
32%	24	More than (10) years	
100%	75	Total	

**Source:** Prepared by the researcher based on the questionnaire form.



**3- Description of the research sample according to academic qualification:** The statistical results presented in Table (5) indicate that a percentage of (74.6%) of the sample are holders of a bachelor’s degree, as this category represented the highest percentage in terms of academic qualification, then followed by the category of individuals surveyed who held a bachelor’s degree. The percentage of the master’s degree in this category was (16%), while the doctorate or its equivalent category was (9.5%), while the other categories had a percentage of (0%). This means that the research sample has the ability to know the nature of the work, which reflects positively on the final results of the study. Table No. (5) shows these percentages.

**Table No. (5): Description of the research sample according to educational attainment**

percentage	Repetition	Target sample	Variables
0%	0	Diploma	Academic qualification
74.6%	56	Bachelor's	
16%	12	Master's	
9.3%	7	Ph.D	
0%	0	Other	
100%	75	Total	

**Source:** Prepared by the researcher based on the questionnaire form

**Second:** Statistical analysis of the sections of the cloud accounting section

Ranking	t value	Relative weight	standard deviation	Arithmetic mean	Paragraph	se
1	23.17	88.60	0.567	4.38	The employees working in the company have in-depth knowledge of the concept of cloud accounting	1
5	13.11	78.20	0.676	3.97	The company has an intention to adopt cloud accounting in the near term	2
3	19.47	81.92	0.547	4.13	The advantages of cloud accounting play a major role in making it better than traditional accounting for adoption.	3

4	9.37	78.72	1.029	3.99	<i>There are many obstacles and challenges to cloud accounting that make companies reluctant to use it at the present time</i>	4
2	13.44	80.06	0.743	4.16	<i>The technological and financial risk factor of cloud accounting makes the company hesitant to use it.</i>	5

The tabular t value at a significance level of 0.05 and a degree of freedom of “74” equals 1.995.

**From Table No. (6) the following is clear:**

1- Paragraph (1), which is (that the employees working in the company have in-depth knowledge of the concept of cloud accounting) came in first place in terms of the degree of agreement among the members of the study sample, with a mean value of (4.38), which indicates the direction of the research sample towards (agreed). Completely), and with very good homogeneity in the answers, and this is confirmed by the value of the standard deviation of (0.567) and the relative weight equals 88.60%, which is greater than the neutral relative weight of “60%”. The value of t reached (23.17), which is greater than the value of the tabular t. At a significance level of 0.05 and a degree of freedom of “74” it equals 1.995. This indicates that the employees working in the company have in-depth knowledge of the concept of cloud accounting.

2- Paragraph (2), which is (The company has an intention to adopt cloud accounting in the near term) came in last place in terms of the degree of agreement among the members of the study sample, with an arithmetic mean value of (3.97), which indicates the direction of the research sample towards (agreed), and with homogeneity. Very good in the answers, and this is confirmed by the value of the standard deviation of (0.676), and the relative weight reached (78.20%), which is greater than the neutral relative weight “60%”. The value of t reached (13.11), which is greater than the value of the tabular t at the level of significance. 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the administration has an intention to adopt cloud accounting soon.

3- Paragraph (3), which is (The advantages of cloud accounting have a major role that make it better than traditional accounting for its adoption.) came in third place in terms of the degree of agreement among the members of the study



sample, with an arithmetic mean value of (4.13), which indicates the direction of the research sample towards (Agreed), with very good homogeneity in the answers, and this is confirmed by the standard deviation value of (0.567) and the relative weight equals 81.92%, which is greater than the neutral relative weight of 60%. The  $t$  value reached (19.47), which is greater than the tabular  $t$  value at the level of significance. 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the advantages of cloud accounting play a major role in making it better than traditional accounting for its adoption.

4- Paragraph (4), which is (There are many obstacles and challenges to cloud accounting that make the company reluctant to use it at the present time) came in fourth place in terms of the degree of agreement among the members of the study sample, with a mean value of (3.99), which indicates the direction of the research sample. Aim for (agreed), with very good homogeneity in the answers, and this is confirmed by the standard deviation value of (1.029) and the relative weight equals 78.72%, which is greater than the neutral relative weight of “60%.” The value of  $t$  reached (9.37), which is greater than the value of the tabular  $t$  at the level. The significance of 0.05 and the degree of freedom of “74” equals 1.995. This indicates that there are many obstacles and challenges to cloud accounting that make the company reluctant to use it at the present time, including obstacles to Internet flow, as it constitutes a major obstacle for all customers due to the constant interruptions and weak flow in general.

5- Paragraph (5), which is (The technological and financial risk factor of cloud accounting makes the company hesitant to use it.) came in second place in terms of the degree of agreement among the study sample members, with a mean value of (4.16), which indicates the research sample’s direction towards (Agreed), with very good homogeneity in the answers, and this is confirmed by the value of the standard deviation of (0.743) and the relative weight equals 80.06%, which is greater than the neutral relative weight of “60%”. The value of  $t$  reached (13.44), which is greater than the value of the tabular  $t$  at the level A significance of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the technological and financial risk factor of cloud accounting makes the company hesitant to use it.



**Third: Statistical analysis of the paragraphs of the accounting information quality section**

Ranking	t value	Relative	standard deviation	Arithmetic mean	Paragraph	se
2	14.17	76.60	0.566	4	Using cloud accounting provides relevant information that makes decisions within the company	1
5	11.12	56.20	0.345	3.68	The use of cloud accounting improves the level of financial reporting by providing integrated information about the company which enhances the feature of honest representation.	2
1	15.47	76.92	0.534	4.13	Using cloud accounting provides error-free information about the company, which enhances honest representation.	3
3	8.37	69.72	1.030	3.96	The characteristics of cloud accounting in terms of speed and diversity affect the characteristics of accounting information in an integrated manner, as well as the determinants of cost and accuracy.	4
4	15.11	78.92	0.542	3.94	The use of cloud accounting improves the comparability of information between company branches or between a parent company and its market counterpart.	5

The tabular t value at a significance level of 0.05 and a degree of freedom of “74” equals 1.995.

From Table No. (9) the following is clear:

1- Paragraph (1), which is (using cloud accounting leads to providing appropriate information that helps in making decisions within the company) came in second place in terms of the degree of agreement among the study sample members, with a mean value of (4.00), which indicates the direction of the research sample. Aim for (agreed), with very good homogeneity in the answers, and this is confirmed by the standard deviation value of (0.566) and the relative weight equals 76.60%, which is greater than the neutral relative weight of “60%”. The *t* value reached (14.17), which is greater than the tabular *t* value. At a significance level of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the use of cloud accounting will provide appropriate information that will help in making decisions within the companies in the research sample.

2- Paragraph (2), which is (The use of cloud accounting leads to improving the level of financial reports by providing integrated information about the company, which enhances the characteristic of honest representation) came in last place in terms of the degree of agreement among the study sample members, with a mean value of (3.68). , which indicates the trend of the research sample towards (agreed), and with very good homogeneity in the answers, and this is confirmed by the standard deviation value of (0.345) and the relative weight reached (56.20%), which is greater than the neutral relative weight of “60%”. *t* (11.12) is greater than the tabular *t* value at a significance level of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the use of cloud accounting leads to improving the level of financial reports by providing integrated information about the company, which enhances the characteristic of honest representation.

3- Paragraph (3), which is (Using cloud accounting leads to providing error-free information about the company, which enhances the characteristic of honest representation.) came in first place in terms of the degree of agreement among the members of the study sample, with an arithmetic mean value of (4.13), which indicates The trend of the research sample towards (agreed), and with very good



homogeneity in the answers, and this is confirmed by the value of the standard deviation of (0.534) and the relative weight equals 76.92%, which is greater than the neutral relative weight of “60%”. The value of  $t$  reached (15.47), which is greater From the tabular  $t$  value at a significance level of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the use of cloud accounting leads to providing error-free information about the company, which enhances the characteristic of honest representation.

4- Paragraph (4), which is (The characteristics of cloud accounting in terms of speed and diversity affect the characteristics of accounting information in an integrated manner, as well as the determinants of cost and benefit.) came in third place in terms of the degree of agreement among the study sample members, with a mean value of (3.96), Which indicates the trend of the research sample towards (agreed), and with very good homogeneity in the answers, and this is confirmed by the standard deviation value of (1.030) and the relative weight equals 69.72%, which is greater than the neutral relative weight “60%”. The  $t$  value was (8.37). It is greater than the tabular  $t$  value at a significance level of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the characteristics of cloud accounting have an impact on the characteristics of accounting information in an integrated manner, as well as on the determinants of cost and benefit.

5- Paragraph (5), which is (The use of cloud accounting leads to improving the comparability of information between company branches or between a specific company and its counterpart in the market.) came in second place in terms of the degree of agreement among the study sample members, with a mean value of (3.94). ), which indicates the trend of the research sample towards (agreed), and with very good homogeneity in the answers, and this is confirmed by the value of the standard deviation of (0.542) and the relative weight equals 78.92%, which is greater than the “neutral relative weight” of 60%, and the  $t$  value reached (15.11). It is greater than the value of the tabular  $t$  at a significance level of 0.05 and a degree of freedom of “74” equals 1.995. This indicates that the use of cloud accounting leads to improving the comparability of information between



branches of the company or between a specific company and its counterpart in the market.

### **3-3: Testing research hypotheses**

*This axis aims to test the influence relationships between the independent variable (cloud accounting) and the dependent variable (quality of accounting information), and in light of the main hypothesis which states (there is no statistically significant effect at the level of statistical significance for cloud accounting on the quality of accounting information in public joint-stock companies Iraq), from which three sub-hypotheses emerged, using a simple linear regression model. The levels of analysis were taken at the sub- and total levels to determine the significant effect of each sub-variable of the independent variables on each sub-variable of the dependent variables. As for accepting or rejecting the main effect hypothesis, the By calculating the number of significant models as a percentage out of all models, if it achieves more than (50%), the hypothesis is accepted, but if the significant models are less than this percentage, the hypothesis is rejected. As for the dimensions of the hypothesis, this is done by comparing the calculated (F) with the tabulated (F) value. Below the level of significance (0.05) as follows:*

*The main hypothesis of the research: (There is no statistically significant effect at the level of statistical significance for cloud accounting on the quality of accounting information in Iraqi public shareholding companies). Three sub-hypotheses have branched from this hypothesis, as shown in Table (10)*

**Table (10): shows the effect of cloud accounting on the quality of accounting information**

decision	Moral	Calculated F value	The coefficient of determination R <sup>2</sup>	Beta coefficient β	Fixed limit )a(	Cloud accounting Quality standards Accounting information
effect	.642	3.981	.615	.128	1.775	Relevance of accounting information
effect	.012	15.994*	.714	.661	.756	Objectivity of accounting information
effect	.095	4.508*	.905	.349	2.949	Timeliness of accounting information
	2					number
	30%					Relative importance
						Moral models

**\* Tabulated F value at 0.05 level = (3.89)**

1- Analysis of the impact of cloud accounting on the suitability of accounting information: It is clear from Table (10) that the calculated (F) value reached (3.981), which is greater than the tabulated (F) value of (3.89) at a significance level (0.05), and at a significance level ( 642.), This means that there is an effect of cloud accounting on the dependent variable, suitability of accounting information, and from the same table it is possible to notice the value of the constant (1.775a =), and this means that there is an effect of cloud accounting in the amount of (1.775), even if the suitability of accounting information is equal to Zero. As for the value of (128 = □), it means that a change of one unit in cloud accounting will lead to a change in the suitability of accounting information of (128). As for the value of the coefficient of determination (R<sup>2</sup>), it was (.615). This means that cloud accounting explains 61% of the variance occurring in the suitability of accounting information.

2- Analysis of the impact of cloud accounting on the objectivity of accounting information: It is clear from Table (10) that the calculated (F) value reached (15.994), which is greater than the tabulated (F) value of (3.89) at a significance level (0.05), and at a significance level ( 012.), This means that there is an effect of cloud accounting on the dependent variable, the objectivity of accounting information, and from the same table it is possible to note the value of the constant (0.756 = a), and this means that there is a presence of cloud accounting of (0.756) even if the amount of objectivity of accounting information is equal to Zero. As for the value of (661 = □), it means that a change of one unit in cloud accounting will lead to a change in the objectivity of accounting information of (661). As for the value of the coefficient of determination (R<sup>2</sup>), it was (714), This means that cloud accounting explains (0.71%) of the variance occurring in the objectivity of accounting information.

3- Analysis of the impact of cloud accounting on timeliness of accounting information: It is clear from Table (10) that the calculated (F) value reached (4.508), which is greater than the tabulated (F) value of (3.89) at a significance level (0.05), and at a significant level. (.095), and this means that there is an



effect of cloud accounting on the dependent variable, the timing of accounting information, and from the same table it is possible to notice the value of the constant ( $2.949 = a$ ). This means that there is a presence of cloud accounting of (2.949), even if the amount of timing is The accounting information is equal to zero. As for the value of ( $349 = \square$ ), it means that a change in the amount of one unit in cloud accounting means a change in the timing of the accounting information of (349). As for the value of the coefficient of determination ( $R^2$ ), it was (905). This means that cloud accounting explains 90% of the variance occurring in the timeliness of accounting information.

Based on the above-mentioned results, I collect them, and considering the percentage of relative importance, we find that it is less than 50%. Therefore, we reach the rejection of the null hypothesis and the acceptance of the existence hypothesis, which indicates the presence of a statistically significant effect at the level of statistical significance for cloud accounting on the quality of accounting information in Iraqi public shareholding companies. This indicates that it is necessary to adopt this technology and be prepared and prepared to apply it, for the purpose of developing international financial reports in line with cloud accounting applications and their risks, in order to ensure the preservation of the quality and credibility of financial reports and the information they contain.

#### **The fourth topic:**

#### **Conclusions and recommendations**

##### **4-1: Conclusions:**

- 1- Cloud accounting is considered one of the modern technologies based on cloud computing, which helps those in charge of the accounting information system perform their work easily.
- 2- Cloud accounting helps organizations reduce costs and benefit from many advantages, but this is accompanied by many possible risks that must be taken into consideration.
- 3- There is a moderate degree of in-depth knowledge of the concept of cloud accounting in the business environment of joint-stock companies, the research

sample, in addition to an absolute lack of confidence in relying on it, despite the advantages it produces related to reliability, lower risks, and lower cost, especially with the expansion of the volume of activity, which is accompanied by an expansion of financial statements. .

#### **4-2: Recommendations:**

1- The need to draw companies' attention to the advantages of cloud accounting in the long term, rather than limiting it to the short term by judging its ineffectiveness and comparing it with traditional systems.

2- Gradual integration is considered a good option that business organizations and companies can rely on in order to learn about the various advantages available through conducting accounting courses, taking into account the comparison of traditional and modern accounting, and then evaluating that period before relying entirely on cloud accounting.

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## **Investigating the Pedagogical Problems That Encounter Sudanese Teachers (ELT).**

**Dr. Ahmed Ismail Mahmoud Ismail<sup>89</sup>**

*Associate Professor – University of Eli mam El mahadi Elmahadi –*

**Dr. Rehab Abdelsalam Elsanousi Mohammed**

*Assistant professor –University of Hail – English Language -Department – Saudi Arabia*

**Dr. Mugtaba Ahmed Elghale Eldai,**

*Assistant Professor – University of Eli mam El mahadi Elmahadi –*

### **Abstract**

*This paper investigates the pedagogical problems of teaching English to Sudanese Secondary School students in Kosti. It aims to find out the relationship between the pedagogy of teaching and the level of the linguistic competence of Proficiencies. The Study adopted the descriptive analytical method, the data collection tools were a questionnaire and classroom observations. These two instructions provide to be reliable and valid. They measure what they should measure the population of study were (80) of English teachers of secondary schools in Kosti. They were exposed to the questionnaire and observed in the classroom more than once. The sample of the study were (10) secondary schools in the city of Kosti. The White Nile State in Sudan. The statistics analytical indicates that there was a strong relationship between teaching and proficiency in English. The findings were discussed in the light of hypotheses indicated that less experienced English teachers don't have any background of communicative language teaching. They have a positive attitudes towards using the Arabic in their English lessons and prefer it as the easiest and simplest teaching in contrary of more experienced English teachers who never use Arabic in explaining grammatical structures. Accordingly to this, the research stated its conclusions and recommendations, the main recommendation is that, teachers of English must be trained and made competent.*

**Keywords** *investigates, pedagogical, teaching English, Sudanese Secondary School*

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<sup>89</sup> awabahmed827@gmail.com



## **Introduction**

### **OVERVIEW**

*English Language is termed as a global language because of the role it plays in communication and economy, Pedagogy, being a significant factor in English language teaching, the language became hard and most often by some individual regard as complicated. This is because most teachers lack the best method to use in passing their instructions to students. Methods of English language teaching are the basic ways of passing teaching and making students understand English language.*

*Over the last two decades, a great emphasis has been laid upon learners and teachers of English. This shift of interest appeared as a response to discovering how learners process new information, and what kind of specific actions and behaviors they may employ in other to understand, learn or remember the information available.*

*It is obviously noticed that no two learners learn a FL, or use it in exactly the same way, Ellis (1983:1). This leads us to believe that variability in the learners' language occurs because of individual difference; first of all in the way learners learn FL, and then in the way they use their FL knowledge. In this respect, many questions have been raised starting with the question, how do learners handle the input they receive and relate it to their existing knowledge? If there was to be some sort of internal processing, in what ways is it related to the input and consequently to the output? And finally, how does each of these affect the other? To find out how the FL learners utilize the language data, which they expose to, it is necessary to consider the learning strategies that they exploit.*

*It can be noted that a number of learners are merely receivers more than being participants. They almost receive instructions particularly in English grammar, more than they practice English apparently. Therefore, more exposure to the language is an important resource to achieve communication. Since the classroom is the perfect place for learning, teachers are supposed to rely on the English language to provide the students with the needed exposure.*

### **Statement of the problem**

*It has been observed that most of students in fail English due to ineffective teaching method. Many reasons are said to be the cause of student failure. We can see in the language difficulties faced by many students at universities, therefore this research is centered on the English language teaching methods and how they are applied and their effects on student performance. English language learners will become aware of the fact that they can actually control and improve their own hands. By using such strategies, the learner will be able to participate effectively in English classes through self-directed involvement, which is useful for developing communicative competence.*

***The study aims to***

- 1-Reveal the causes behind the weakness of Sudanese secondary school students to communicate in English.*
- 2-Find out proper pedagogy, techniques and strategies for helping them to use English.*
- 3-Identify the extend in which the FL is used in such lessons.*

***The questions of the study:***

- 1-Do less experienced teachers always use L1 in their teaching.*
- 2- Do less experienced teachers of secondary schools use less of the L1 in the FL lessons.*
- 3- Do less experienced teachers of secondary schools never use the L1 in the FL lessons.*

***The Hypothesis of the study:***

- 1-Less experienced teachers always used the L1 in their teaching.*
- 2-Less experienced teachers of secondary schools use less of the L1 in the FL lessons.*
- 3-Less experienced teachers of secondary schools never use the L1 in the FL lessons..*

***Significance of the study:***



This study is important for teaching of the FL in Sudanese public secondary schools. It will help English teachers to employ different techniques and strategies among which is the use of the L1.

Methodologists have always been advising teachers to use different techniques in teaching foreign languages. Throughout the history of teaching English languages, various techniques have been developed, and some were eradicated ( e.g. reciting a list of isolated word or phrases ). The effectiveness of any technique in the teaching-learning process gives it the validity to continue in use and to undergo improvements .

### **Limitation of the study :**

This study is limited to survey of secondary schools English teachers who are teaching English in 10 schools in the city of Kosti (White Nile State). teachers of FL. The investigation is limited to use of the L1 in the aspects specified in the hypotheses

### **Related Literature Review :**

This study deals with methods and Approaches of teaching English language and how the use of L1 in teaching the FL is viewed. Before going through this investigation, it is worth discussing the difference between the three aspects; Pedagogy/method, approach and technique. It is useful to Anthony's definitions of these terms (in Richards and Rodgers. 1996:15). He states that "... An Approach is a set of correlative assumptions dealing with the nature of language and learning". It means certain theoretical brief related to the process of learning.

Methods/ Pedagogy on the other hand, represent the practical procedure chosen to put the theoretical principles of any Approach into practice. It is the level at which a theory is put into practice and at which choices are made about the particular skills to be taught, the context to be taught, and the order in which context will be presented (ibid).

Technique as defined by Richards and Rodgers (1996:15) "... is the level at which classroom procedures are described ". They are specific activities manifested in the class and they are " ..... consistent with a method and therefore in harmony with approach, method and technique are interdependent



and " they are forming a hierarchical system with the approach at the top followed by method and technique respectively (Al-Mutawa and Kailani. 1998: 12).

However, approaches and methods may have the same technique respectively. Al-Mutawa and Kailani states that

"Although the concept of approach means certain theoretical beliefs or principles, the term is often used in the sense of method especially when talking informally, (ibid).

Therefore, teachers vary their methods and techniques to meet the level of the class they teach and to cover the linguistic units to be taught. Different methods and approaches have always sought the improvement of teaching-learning processes.

### **The Grammar Translation Method (MTM)**

This method is still in use by many teachers not only in Sudan but also over the world although as Richards and Rodgers (1996:5) point out "It is a method for which there is no theory of language learning. The theoretical assumption come from the interpretation of the FL or as Stern (1986:455) states "... as a system of rules to be observed in texts and sentences and be related to first language meaning " According to GMT learning is viewed as " ....an understanding of the grammar of the language expressed in traditional terms. And at training the student to write the language accurately by regular practice in translating form native language " (Rivers.1968: 16). Learning the FL is considered as intellectual activity. Which involves earring and memorization of rules and facts through massive translation from the L1 into the FL and vice versa?

Therefore, the L1 is the vehicle on which the students and teachers heavily rely. The L1 is maintained as the reference up on which the students build the FL acquisition.

Although the study of GTM technique shows that, the language used in class is mostly the students' language "(Freeman. 1986: 12)/ it is the medium of instruction too.

### **The Direct Method (DM)**

Proponents of the DM have "... A common belief that students learn to understand a language by listening to great deal of it and that they learn to speak it by speaking it- associating speech with appropriate action" (Rivers.1968:18). Whereas Richards and Rodgers (1997: 9). Assume that "direct and spontaneous use of foreign language in the class" help the students to "... Be able to induce rules of grammar " Therefore great exposure to the FL in the class enables the students to develop the ability to think in the FL through demonstration, using realia, mime and direct association between the FL and meaning, learning is viewed as analogous to first language acquisition, and the learning processes involved were often interrupted in terms of an associated psychology "(Stern.1996:459). Thus, the purpose of learning according to the DM is to communicate in the FL to achieve this, Freeman (1986:24) states that "in order to do this successfully, students should learn to think in the target language ". Hence, the relation between the students and the teachers is "... More like partners is the teaching-learning process "(ibid).

### **The Reading method**

This method aims at teaching reading for the purpose of the correct pronunciation, comprehension of complicated spoken language. And the use of the simple speech patterns" (Rivers.1968:22). Students are trained to deduce meanings of words from contexts without conscious efforts to translate what they read. Although the goal of teaching is training in reading comprehension, stern (1996:461) adds that "the spoken language was not entirely neglected, but it was the reading objective that received the main emphasis". Grammar is tough principally through the structure dealt with in the reading material

### **The Audio-Lingual Method (ALM)**

New ideas about language and learning derived from descriptive linguistics and behavioral psychology were utilized in developing this method. As Brown (1983: 70) points out" ALM was firmly grounded in linguistic and psychological theory ".Throughout learning students can develop oral



competence. Thus, listening and speaking receive a great emphasis in the teaching –learning process. Since the aim is communication, freeman (1986:43) believes that "Students need to over learn the target language. To learn to use it automatically without stopping to think". Consequently the students from new habits in the FL that help the overcome the old habits of their L1 generally.

Therefore, dialogues are learned through imitation and repetition "... new vocabulary and structures. Are presented through dialogues "(ibid). On the other hand. There is no grammatically explanation "... Grammar is taught by inductive analogy rather than deductive explanation "(Prator and Cele. Murica. 1979 in Brown. 1983:71)

### **Cognitive Theory**

The theory "Lays emphasis on conscious acquisition of language a meaningful system it seeks abases in cognitive psychology and transformational grammar" (Stern.1986:469). It was developed in response to criticism leveled against ALM by Chomsky and his proponents. It was an attempt to apply the findings of research and the new insights of psychology. Psycholinguistics and modern developments in linguistics to the FL teaching and learning. Learning according to the cognitive theory is controlling ' ... the language in all its manifestations as a coherent and meaningful system " (ibid) which the students can use in real life contexts.

### **The Silent Way**

This is a method, which is based on hypotheses about psychological aspects of language learning. For instance, Richards and Rodgers (1996: 101) state that ".... The silent way takes a structural approach to organization of language to be thought ". Learning is separated from the social context and based on grammatical complexity, which is broken down into elements. The basic unit of teaching is the sentence and "... the teacher focuses on prepositional meaning, rather than communicative value" (ibid). Silence of teachers monitors the students to interact with the teacher to create an environment that encourages the students to risk talking and facilitates learning. Either students



are expected to depend on their previous knowledge in their L1 or FL to learn what is new in the FL.

### **Suggestopedia**

This method is not based on a theory of language nor any particular assumptions regarding language learning. Learning as freeman (1986:81) states "... is accomplished desuggesting the psychological barriers learners bring with them to the learning situation" In order to reduce the stress of learning. The teacher initiates interaction himself or herself. Using the FL. Thus " the learner learns not only from the effect of direct instruction but from the environment in which the instruction take place " Richards and Rodgers 1996: 145). Everything in the classroom including the personality of teachers supports the success of the learning process. When the teacher present any learning material, the L1 is the vehicle hat is passes through .

Most methodologists have agreed that incompetent teachers can resort to L1 as a solution to their incompetence although this reduce the time allotted to FL. Certain reason may complete educational authorities to employ incompetent teachers sometimes ( e.g. lack of teachers in certain places ).

While Gairns and redman ( 1986 : 75-76 ) on their turn point out that " ... translation can be a very effective way of conveying meaning " especially when dealing with vocabulary items which have no L1 equivalent. L1 use can save time that can upset students more. Similarly Atkinson ( 1987 : 243 ) agrees with gairns and Redman. Using the L1 enable the students to develop the ability to distinguish between linguistic items. Therefore he advices teachers to employ other strategies such as paraphrasing, realia and using the L1 when other strategies do not work. Teachers in their turn have different strategies of explaining new items. For example, Chaudron in Crooks Chaudron ( 1991 ) ( in Todd . 1997 . 79) found that :

Teachers explain vocabulary items using repetition and emphasis, analysis of morphology, antonyms and synonyms, non-verbal demonstration, verbal Examples, definition, paraphrases and translation.

Giving instructions in the FL is one perfect of authentic language teacher's use in classroom. The students learn a lot of things that they themselves use later on even outside the classroom.

Language of instructions seems to be easy, simple and repeated. So that the students get the idea behind it without the L1 help.

When the teachers practice any activities in the FL ,the students are encouraged to use it. Parrot ( in Todd 1997 : 37) states that " the giving of instructions in the classroom is one of the few genuinely communicative acts which takes place and is thus a valuable opportunity for the teachers to exploit as authentic communication in L2 ". Harbord ( 1992.353) agrees with parrot and considers giving instructions genuine opportunities of communication in classroom.

Furthermore edge ( 1996.73 – 75 ) advises teachers to run their classes in the FL to offer chances of more practice. The students know that the FL can be used for achieving communication. Consequently they can acquire the language. He adds that using the FL " introduces forms and uses of the language which the syllabus will not cover " (ibid). Involving the students in small English-using community is considered as one of the most important contributions to their learning the language effectively.

### **Discussion of results in the light of hypotheses**

On discussion of Hypotheses, W.A.Ms and the chi-square were used to test them. The W.A.Ms was used to obtain the percentage of teachers in each scale. The chi-square was used to accept or reject any of these Hypotheses.

#### **1 – Hypothesis No.1**

" Less experienced teachers always use L1 in their teaching " The analysis of teachers' response to the question of second part of the questionnaire, namely " Do you use Arabic in English language lessons " reveals that ( 98.33%) of the teachers use the L1 to different extents. This reflects their positive attitude towards using the L1 as far as the students' achievement is concerned by doing so. They employ certain recommendations advocated by some methods and approaches ( see.2.2-9,2-10 ) However, most of the do not realize the danger behind using the L1 excessively in contexts where the FL will be perfect. Off



course some of them are unaware of the impact of overusing the L1 especially to those students who are supposed to continue their studies. Consequently the hypothesis is accepted.

**2- Hypothesis No . 2**

" More experienced teachers use less L1 in the FL lesson" . Statistical analyses show that more experienced teachers use less L1 in their teaching than their colleagues of less experienced in general (see discussion of tables 4-1,4-2 and 4-3).going through more detailed analysis of the obtained values sheds more light on teachers of (11-15)years and(15and more years)in teaching the FL

**Table No.(4-5) The percentage of more experienced teachers.  
experience Years of**

NO	Cases	11-15	15and more
1	Give instructions in class	25%	16.66%
2	Explain difficult vocabulary	14%	10.71%
3	Explain grammatical structure	14%	10.71%
4	Translate full sentences	0%	12.05%
5	Correct pronunciation	11.11%	27.11%
6	Correct errors orally	15.78%	1.57%
7	Elicit students response	23%	15.38%
8	Motivate students	22.22%	5.55%
9	Attract students attention	22.22%	16.66%
10	Helping students cope with the subject	12.50%	31.20%
11	Get feedback in feedback sessions	18.8%	45.45%
12	Reduce the stress and tension of students	12.15%	6.25%
13	Overcome my own Language deficiencies	6.25%	0%
14	Save time	12.05%	15.70%
15	Help weak students	18.42%	23.70%
16	Invest the only appropriate technical I know well	26%	6.9%
17	Explain examination questions	10.71%	13%
18	Introduce a new item	22.72%	13%
19	Clarify idiomatic expressions	15.15%	21%
20	Teach abstract lexical items	19.04%	33%
21	Be as last resort	6.66%	20%
22	Support my English explanation	21.05%	21%
23	Review any items	21.24%	7.21%
24	Any other		

The above table indicates the percentage of more experienced teacher using the L1 to deal with these items These values ( in table 4-5 ) indicates that more



experienced teachers resort less L1 while dealing with the items of the questionnaire. They have benefited a lot from their experience in teaching. They also overcome a lot of their anxiety and become familiar with the learning situation. Therefore this hypothesis is accepted.

### **3 – Hypothesis No. 3**

*" Less experienced teachers of secondary schools never use the L1 in FL lessons "*.

With reference to the teachers' responses to the second part of the questionnaire , ( 93.33% ) of the sample confirm their implementation of this technique. This value indicates that the majority of teachers know the advantage of this technique and they attempt to benefit from it to a great extent. Therefore this hypothesis is rejected.

### **4 – Hypothesis No. 4**

*" Less experienced teachers in secondary schools translate only difficult vocabulary items and expressions" statistical analysis of teachers' response shows that less experienced teachers advocate translation of difficult vocabulary items and expressions more often than more experienced ones. Thus, teachers of ( 1-6 ) years of experience represent ( 60.71% ) of the translation as the most suitable technique. They have got certain excuses for applying it. They lack facilities . teaching aids and in service training.*

*The time allotted to the subject in general and the intensity of the teaching material increase the difficulties for the teachers . both the teachers and students seem less motivated to teaching and learning.*

*The Examination policy conducted compels these teachers to carry out this technique . The new curricula of the secondary schools with its different subjects of different specialization present difficulties to the teachers and lead them to resort the L1 more often.*

*However, the FL can offer a lot of more effective technique such as paraphrasing antonym. Synonym, using realia and analysis of morphology to deal with these items. Yet the teachers should be better motivated and trained in order to implement this and students has to be motivated too.*

Other facilities have to be available to obtain successful learning. But in the current situation , The L1 use seems to be dominant therefore, This hypothesis is accepted.

### **5 – Hypothesis No. 5**

*" Less experienced teachers of secondary schools use the L1 in explaining grammatical structures of the FL "*

*Teachers responses reveal that the most teacher use the L1 to a very large extent to clarify grammatical structure . It is worth mentioning here that ( 60%) of the obtained value of the option " Always " represent less experienced teachers ( see discussion of always ).*

*It was observed by the present writer that many teachers are concerned with making their students understand these items. They assume that the accuracy in the main objective of teaching the FL. Therefore, They often accompany their explanations with English another in the L1. It seems as if both teachers and students cannot be satisfied unless the L1 is used*

*Such findings can be attributed to many reasons. First, Many teachers still believe that accuracy is more important in achieving communication and that understanding grammatical structure is the key to going this. Hence more seriousness and interest are seen while giving sometimes long explanations of such items. Second and more importantly, all examination at all levels are mainly grammatically based with reference to secondary school diploma ( certificate ) where about ( 70% ) of the question are about grammar.*

*Thirds, teachers are still under the influence of GMT. ( see 2-2 ) and ALM ( see 2-5 ) concerning teaching grammar. Forth, they lack training, reference books or any supplementary materials. Fifth. Inspectors of English in their turn, usually focus on grammatical items more than other items during their regular supervision visits to schools, Sixth, the way the new textbook of secondary schools present grammatical structures through flashes gives the impression that they are not new and they are only kinds of revision. This is the situation where many of them are unable to cope at least in the current time. Thus, the teachers have to explain and re-explain these items through L1 to encourage their students' understanding.*



Seventh, many students consider teachers who do not concentrate on grammatical items by giving a lot of explanation most of it in the L1, as unqualified. Accumulation of all these reasons makes these teachers more dependent on the L1 . Some of these points are drawn from the writer's considerable experience in teaching the FL and what was noticed during the observation, Consequently, this hypothesis is accepted. To the contrary. The L1 is used to a very large extent.

### **– Conclusion**

So far, the previous chapters of the present study have investigated the problems of teaching and communicating in English concerning the use of the L1 in teaching of English. The survey included both viewpoints in favor against the L1 use supported by evidence drawn from their experience in teaching English languages.

It also dealt with opinion of experts in education and pedagogy (see.2-2.1and2.2.2).concerning TEFL in Sudanese secondary schools the new syllabuses, and curricula are based on the CLT as recommended by the educational authority (National center for Educational Planning & Vocational Training).

The new serial books of different specialization aim at developing the students' abilities to understand and use the language communicatively. They also tend to prepare these students for long term studies.

As for employing the L1 as technique to great extent by many teachers of secondary schools, a lot of obstacles compel them to resort to such a procedure.

The new curricula with its new approach the level of the students ,lack of motivation of both teachers and students represent serious difficulties.

### **Summary of the findings :**

Less experienced English teachers have positive attitude towards using the mother tongue in English language lessons.

Less experienced English teachers tackle the essential aspects of the English language through the use of the mother tongue.

Less experienced English teachers do not follow precisely the teachers' book in their teaching.



*The level of students is unsatisfactory in general.*

*Less experienced English teachers do not have any awareness or background of communicative language teaching.*

*The number of students in classroom are more than required.*

*Some of the English teachers are not qualified enough.*

### **Hypothesis – Methodology Conclusion**

*All what has been mentioned in additional to the researcher's considerable experience in teaching the FL at different levels have supported the researcher to draw upon the following conclusions:*

*Less Experienced teachers of the FL in some Sudanese secondary schools have positive attitude towards using the L1 in the FL lesson to a very extent. This has its impact on the teaching-learning.*

*Less experienced teachers prefer the L1 as the easiest and simplest technique .*

*Less experienced teachers of the FL tend to use the L1 widely in dealing with vocabulary items, difficult abstract items, grammatical structures, and corrections in general and getting feedback.*

*Less experienced English teachers represent the majority in applying this procedure.*

*Place of graduation, their gender and number of periods have no effect on this procedure.*

*Less experienced English teachers have had no background or awareness of the recommended approach of teaching the FL in reference to the syllabuses of the new curricula.*

*The majority of the FL teaching have had no training or in service-training.*

*Teachers of English tend to follow limited techniques and activities, which is attributed to their unawareness, lack of motivation and carelessness sometimes.*

*Most secondary schools do not have any teaching aids, language laboratories and other facilities equipment.*

*Most students especially males are unmotivated to learn not only the FL but also all subjects respectively.*

*The students' attitude towards learning the FL is not enough to cope with the new changes of curricula of secondary schools.*

The number of students in classroom are big ( 44 – 55 students ) in some schools which affects the teachers' towards giving chances to the students for more practice general and enough exposure to the FL.

### **– Recommendations**

Based on the foregoing finding from this study, the following recommendations are suggested:

Urgent in- service training courses are needed for those teachers who are assigned to teach English to familiarize them with the new developments in this field, To ensure the success and practically of these courses, it is important that they should be carefully-planned, well-managed and financially supported. Another important factor that has to be considered is to encourage FL teachers to attend these courses.

Modify teaching strategies, techniques and classroom behavioral aspects to be in harmony with principles and the objective of the new language materials.

Teaching FL should start in primary schools at the age of nine years or less.

Encouraging students to promote their desire to participate and enhance their willingness to learn, Teachers can account for the following considerations :

Teacher of FL have to create an interesting atmosphere in the classroom and encourage students to participate in the class activity and try to motivate them to communicate in the FL and the teacher have to show himself as a supporter and helper to the students.

It is important the teachers' attention to encourage students and makes them feel that they have made progress with the sense of success.

Teacher have to be firm in a gentle way and praise students when they give relatively correct answers.

Teachers have to treat the students with kindness and respect. Simple a lot and value their opinions .

Teachers have to be sincere and look for opportunities to find them doing something right. Never get frustrated, angry and impatient.

Ovoid criticizing and blaming expressions, the students are teenagers who never accept to be criticized in front of the class.



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## ***The Jews of the Mellahs in the Moroccan Atlas during the Pre-Colonial Period in British Orientalist Writings***

***Dr. Abdelghani EL AMRANI<sup>90</sup>***

*Regional Academy of Education and Training,  
Casablanca-Settat. Kingdom of Morocco*

### ***Abstrat:***

*The Jews of Morocco have always been a major component of Moroccan society, settling in the country during periods preceding the birth of Christ. As they quickly assimilated into the local population and engaged in building and revitalizing social and economic lives, they also contributed, side by side, to shaping the political and diplomatic landmarks of the country since the fifth and sixteenth centuries AD, in particular.*

*In order to ensure the security and freedom of the Jews in practicing their religious rites and revitalizing their economic activities in general, the Moroccan sultans initiated the construction of a special neighborhood for the Jews known in Moroccan circles as «The Mellah». In this study, we will attempt to discuss the history of the construction of the «Mellahs» and the reasons behind it before proceeding to explore the depiction provided by British orientalist writings about these Moroccan Mellahs during the period before the French protectorate.*

### ***Keywords:***

*The Mellah, The Atlas Jews, The Sultans, Morocco, British sources. Orientalist Writings.*

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<sup>90</sup> E-mail : [pr.ghaniho@gmail.com](mailto:pr.ghaniho@gmail.com)

## **Introduction:**

Throughout history, the Jews of Morocco have represented the only non-Muslim religious-ethnic minority in the country. They integrated with the Arab and Berber Muslim population, settling in separate areas that spanned almost the entire Moroccan territory. Their numbers exceeded those of Jews in Algeria and Tunisia<sup>91</sup>. Instead, they constituted the most significant Jewish community in the entire Arab world. In addition to traditional occupations in finance and commerce, involving various transactions both internally and externally, as well as engagement in various crafts and agricultural activities, the Jews stood out for their integration into Moroccan society as an integral component. They immersed themselves in the prevailing culture of both cities and villages. Their contributions played a crucial role in enriching the cultural balance of the country<sup>92</sup>.

In order to ensure the safety of the country's Jews, the Sultans of Morocco took the initiative, early in modern history, to build their own neighborhoods, known in Moroccan circles as «The Mellahs». These neighborhoods contributed to some extent to providing security and safety for them in practicing their various economic, religious, and social activities. Given the significant importance that the «Mellah» holds in the modern and contemporary history of Morocco as one of the fundamental historical «Evidences» indicating the strong presence of the Jewish element in Morocco, We have chosen to focus the discussion in this study on the historical roots of the «Mellahs» and the motives behind calling them «The Mellah». We will then proceed to discuss the living conditions of Jews within these neighborhoods, with a primary emphasis on the Mellahs of the Moroccan Atlas cities. However, our approach to this topic will not be based on local writings or Moroccan Jewish writings. Instead, we will

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<sup>91</sup> British Captain George Robert Beauclerk estimated that the Jewish population in Morocco, during the year 1826 AD was one-third of the total population of the cities. George Robert Beauclerk, *A Journey to Marocco in 1826*, London, 1828, p.277.

<sup>92</sup> Mohammad Kenbib, *The Jews of Morocco 1912-1948*. Translated by Idris ben Said, Publications of the Faculty of Arts and Human Sciences in Rabat, Al-Najah New Press, Casablanca, 1998, p. 17



concentrate on elucidating the perspective of British Orientalists, particularly during the period preceding the era of the Protectorate.

### ***1-The Jewish Quarter (ELMallah): Exploring the Dialectics of Origin and Naming***

Historical narratives differ regarding the date of construction of the first neighborhood for the Jewish community in Morocco and the main motives behind it, as well as the primary reason for naming it the Mellah<sup>93</sup>. However, there is almost unanimous agreement among historical writings on a central idea: The Marinid Sultan Abu Yusuf Yaqoub Ben AbdelHak (1258-1286 AD) built special residences for Jews in 1276 AD after attacks on them by Moroccan Muslims worsened due to the desecration of the mosque and the placement of wine inside its lanterns<sup>94</sup>. This historical narration intersects with what was

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<sup>93</sup> The actual historical reasons explaining the construction of the Mellah are still shrouded in mystery, warranting further research and exploration on the subject. Despite its significant social implications, sources merely provide brief references to its establishment, divorcing it from its supposed political, economic, and social context. These sources often attribute its creation either to rulers' efforts to ensure security and reassure the Jewish population or to their desire to prevent religious or moral conflicts between Jews and Muslims. Consequently, the true motives behind their establishment remain obscure. This ambiguity has prompted some researchers to offer negative interpretations of the Mellahs' construction, portraying them as fortified ghettos designed for isolation and confinement. Mohammed ELahiya, «On the circumstances of the construction of the mellah of the city of Meknes during the reign of Mawla Ismail (1672-1727 AD)». *Hespress Tamuda*, vol. LI, n°. 2, 2016, p. 342.

<sup>94</sup> Researcher Fatima Bouamama referenced a text attributed to the Jews of Morocco, composed in Moroccan colloquial language, detailing the reasons behind the Jews' migration to Mellah in the city: «In the year 5198, Jews residing in Fez were part of the city's population. However, due to forceful eviction by Muslims, some lost their lives, others converted to Islam, and some families left to establish the Mellah. This upheaval originated from the discovery of a bottle of wine in a mosque, leading to jealousy among Muslims. In 5225, Muslims found a Jew dead in the Medina, falsely accusing the Jewish community. Evidently, they targeted and killed numerous Jews,



stated in the «Book of Histories» by the Rabbis of the Ibn Danan El-Fassi family. Although there are differences between the two narrations regarding the year of construction of the Mellah, this family attributes the Marinid Sultan's attempt to establish a special neighborhood for Jews to around the year 1438 AD. According to their narrative «They walked (The jews) until they entered the Great Mosque, blocked its water spring, and filled the marble channels through which water flowed with wine. They spent the night drinking until they were drunk. At dawn, they left the location, leaving behind a Jewish individual who remained intoxicated and asleep. Subsequently, Muslims arrived, took him away, and violence unfolded. All the male Jews they encountered were killed, without exception for those who had changed their faith; even children and women were not spared»<sup>95</sup>. These dwellings were known in Moroccan circles as the Mellah, where the word «Mellah» literally means salt. The origin of this peculiar name is difficult to ascertain<sup>96</sup>. Additionally, these neighborhoods were also referred to as «El-Moussous», meaning «the saltless place». This latter name is used sarcastically to describe a place without salt or considered worthless<sup>97</sup>. To what extent can this proposal be accepted?

There is no established fact that the neighborhoods designated for Jewish elements were known as the mellah until at least the fifteenth century AD. Moreover, there is no specific document or source indicating the use of this word to refer to Jewish neighborhoods before the aforementioned date. The name was

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including men, women, and children during an attack on the emerging mellah. Eventually, only twenty men, along with a few children and women, remained in the Mellah». Fatima Bouamama, *The Jews in the Islamic Maghreb (during the 7th-8th centuries AH / 14-15 AD)*. Mua'sasat Kanoz al-Hikmah for Publishing and Distribution Foundation, 2011, Algeria, pp. 68-69.

<sup>95</sup> Pontiffs from the family of Ibn Danan El-Gharnatiya El-Fassiya, *Book of History*. Translated from Hebrew by Abdel Aziz Chahbar, Tetouan Asmir Association, Shuwaikh Press, 1st edition, 2002, pp. 7-8.

<sup>96</sup> Lawrence Harris, *With Mulai Hafid At Fez: Behind The Scenes in Morocco*, London, 1909, pp.192-193.

<sup>97</sup> Budgett Meakin, «The Jews of Morocco», *The Jews Quarterly Review*, Vol.4, No. 3 (Apr.1892), p.372; *The Moors: A Comprehensive Description*, London, 1902, p.426

not exclusively related to Jewish neighborhoods; it was also used in Muslim neighborhoods. When Rabbi Saadia ben Danan spoke about the entry of Abu Hassoun el-Watassi into Fez, supported by the army of the Ottoman Turks to reclaim his throne from the Saadians, he indicated that this entry was from the «Mellah» of the Muslims. E-Zayani had also spoken about Moulay Rashid al-Alawi's entry into Fez in the year 1667 AD from the wall bordering the Muslim Mellah<sup>98</sup>.

The author of «Al-Istiḡṣā» mentioned that when the Portuguese took control of the city of Ceuta «it was on the morning of a Friday in some months of the year eight hundred and eighteen. The people of Ceuta came to the Sultan of Fez, crying out to him. They wore sackcloth, let their hair loose, and donned black sandals—men, women, and children alike. In response, the Sultan removed them with Muslim boats and then sent them back to «El Fahs»<sup>99</sup> near their lands»<sup>100</sup>

The oldest accounts referring to the Jewish neighborhood as the Mellah date back to the year 1552 AD. It appears that Arabic-speaking Jews were the first to use this name in order to distinguish Jewish neighborhoods from others in Morocco. However, regarding the specific reason for calling it the Mellah, there are four basic hypotheses. The first one refers to the discovery of salty headwater in the place where the Jews first resided in the city of Fez<sup>101</sup>. The second is

<sup>98</sup> Mohammed Maarouf, «Aspects of the History of the Moroccan Jewish Population, the Attraction of Isolation and Mixing». *Amal journal*, 25(50), 2018, 162-163.

<sup>99</sup> Fahs Anjra is one of the regions in the Kingdom of Morocco, situated in the Tangier-Tetouan-El Hoceima region, and is located near the city of Ceuta.

<sup>100</sup> Aḥmad ben Kālid E-Nāṣirī, *Al-Istiḡṣā' li-Akḥbār Dūl al-Maghrib al-Aqṣá. Tāḥqīq wa-Ta'liq: Ja'far E-Nāṣirī wa-Muḥammad E-Nāṣirī, Munshūrāt Dār al-Kutub, Juz 4, E-Dār al-Bayḍā'*, 1997, p. 92

<sup>101</sup> The Spanish researcher Julio Calvo-Serrano, in collaboration with other researchers, as well as the findings of the American researcher Emily Gutrich, notes that the first Mellah constructed in Morocco was in the city of Fez in the year 1438 AD during the reign of the Marinid Sultan Abu Muhammad Abd al-Haqq II (1420-1465 AD). The Mellah was situated in an area with salt deposits, which is why the name Mellah was given to the Jewish neighborhood. Julio Calvo-Serrano et al,



related to the word «thrown», signifying the destination, as the sea water «threw» the Jews after the forced migration from Andalusia (the water acted as a force that led them)<sup>102</sup>. The third hypothesis may be related to granting the right to sell salt to the Jews<sup>103</sup>. As for the fourth and final hypothesis, it is connected to the commissioning of Jewish sultans to salt the heads of rebels<sup>104</sup>.

This last hypothesis has been adopted by a number of British orientalist and others, such as the British diplomat John Drummond Hay<sup>105</sup>, who recounted «On entering the town (Tangier) the soldiers seized the first Jew they met, and obliged him to salt the heads, which were subsequently hung from the top of a

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«Mellah: The Jews Quarter at the Medinas of Morocco. A new Interpretation of the Minority's Space in the Islamic City». *Procedia Engineering* 161 (2016), p.1325; Emily Gottreich, *The mellah of Marrakesh: Jewish and Muslim Space in Morocco's Red City*, Indiana University Press Bloomington, IN 47404-3797 USA, 2007, p.12; «On the Origins of the Mellah of Marrakesh». *Int. J. Middle East Stud*, 35 (2003), the United States of America DOI : 10. 1017.S0020743803000126, p.287.

<sup>102</sup> Ahmed Shahlan, *Moroccan Jews from the Source of Origins to the Winds of Division: A Reading of Heritage and Events*. Bouregreg Printing and Publishing House, 2009, p. 140.

<sup>103</sup> *Ibid*, p. 140.

<sup>104</sup> Muhammad Maarouf, *op, cit*, p.164.

<sup>105</sup> He descended from the Scottish aristocracy and was born in the French city of Valenciennes on June 1, 1818 AD. He arrived in the city of Tangier in 1832 AD when he was no more than fifteen years old. There, he focused his interests on learning the Arabic language, becoming proficient in both writing and translating some of its texts into English. This laid the initial groundwork for his future diplomatic endeavors in Islamic countries. He first served as Assistant British Consul General in Alexandria under Hodges before moving on to work in the service of Lord Ponsonby in Constantinople. Subsequently, he was appointed Consul General of Britain in Morocco after the passing of his father, Edward, in the year 1845 AD. This marked the commencement of a lengthy period during which John Drummond Hay remained in Morocco, the conclusion of which was not determined until the year 1886 AD. Khalid E-Saghir, *Morocco and Great Britain in the Nineteenth Century (1856-1886)*. E-Najah New Press, 2nd ed, 1997, pp. 52-54; Jean-Louis Miège, *Le Maroc et L'Europe 1822-1906*. Tome II, Editions La Porte, Rabat, 1962, pp. 271-277.



square tower on the town wall, fronting the great market-place»<sup>106</sup>, and the English journalist James Edward Budgett Meakin (d. 1906) stated «The former designation is explained by the fact that Jewish butchers are forced to pickle the heads of the rebels, which are to be exhibited according to custom above the gates of the towns as a warning to others»<sup>107</sup>. And also, the artist Lawrence Harris (d. 1970 AD) mentioned that the Moroccans called it (the Mellah) sarcastically because the heads of all the rebels were sent to the Mellah to be salted by the Jewish butchers in preparation for hanging them above the gates of the city<sup>108</sup>. However, the rabbis reject this proposal and consider it sarcastically. They assert that the Jews were the first to give the name Mellah to their neighborhood (the place of salt) and that salt plays an important role in life, as the rest of the world's Jews believe<sup>109</sup>.

Despite differences in historical narratives regarding the roots of the Mellah and the true reasons behind its designation, the historical fact that no one disputes is that Moroccan sultans allocated special neighborhoods, isolated from the Muslim communities, for Moroccan Jews in almost all major Moroccan cities. These neighborhoods, known in Moroccan circles as the Mellah, were designated to prevent potential conflicts between Jews and Muslims and to preserve the foundation of Moroccan unity across various societal components, regardless of race and religion. These neighborhoods were heavily guarded, with a commander at every entrance preventing Muslims from entering. Additionally,

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<sup>106</sup> John Drummond Hay, *Western Barbary: Its Wild Tribes and Savage Animals*. London, 1844, p. 58.

<sup>107</sup> E. Budgett Meakin, «The Jews of Morocco», *op,cit*, p.372; *The Moors...*, *op, cit*, p.427.

<sup>108</sup> Lawrence Harris, *op, cit*, p.193; Ahmed Shahlan, *op, cit*, p.140.

<sup>109</sup> Lawrence Harris, *op, cit*, p. 193.

all entrances were closed in the evening, and the keys were taken to the governor's house<sup>110</sup>.

## **2-Jewish Neighborhoods (The Mellahs) Through British Eyes**

British Orientalist writings elaborated on diagnosing the reality of Jewish neighborhoods, whether in the villages of the Atlas Mountains or the Mellahs of major cities like Fez, Meknes, and Marrakesh during the nineteenth century and the preceding centuries. They detailed the conditions of daily life within those neighborhoods and more. However, this diagnosis appears to contain prejudice and harsh judgments. Tracing the British presence in the Atlas land, we observe their use of linguistic vocabulary that devalued the Jews of the region and their dignity. They described them with the ugliest terms, belittled their ways of living, and despised their alleys and streets. The English journalist Budgett Meakin considered the streets of Jewish neighborhoods, whether in the Atlas regions or other Moroccan cities, as «The streets of the Jewish quarters are the filthiest of all the Moorish towns, and are often several feet deep rubbish, so that, visitors descend by steps into the houses»<sup>111</sup>. He depicts the Jewish residents as dirty and filthy, alleging that they bathe only three or four times a year, leaving them vulnerable to various skin diseases. They emanate a foul odor. In contrast, the situation differs among the Jews of coastal cities, who live in a manner akin to Europeans<sup>112</sup>, shielded from external influences. They inhabit a separate neighborhood enclosed by walls accessible only through two gates<sup>113</sup>. Indeed, the affluent among them are always ready to obtain a protection card, guaranteeing numerous privileges. The protected Jew in coastal cities, confident in his immunity, holds his head high, protrudes his stomach, and moves freely, as if

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<sup>110</sup> George Robert Beauclerk, *op, cit*, pp. 277-278; Budgett Meakin, *The Moors...*, *op, cit*, p.426; Stephen Bonsal, *Morocco As It Is: With an Account of Sir Charles Euan Smith's Recent Mission to Fez*. New York, 1893, p. 315.

<sup>111</sup> Budgett Meakin, «The Jews of Morocco», *op, cit*, p.390.

<sup>112</sup> *Ibid*, pp.390-391.

<sup>113</sup> Joseph Dalton Hooker, *Journal of A Tour In Marocco And The Great Atlas*, London, 1878, p.157.



challenging Moroccan Muslims, proclaiming, «Touch me if you dare», and woe to anyone who falls into his grasp<sup>114</sup>.

His description did not differ from that of his colleague Lawrence Harris, who considered the Mellahs of Marrakesh<sup>115</sup>, Fez<sup>116</sup>, and Essaouira<sup>117</sup> - in his view - as the most significant hotbeds of disease, filth, and extreme misery. The residents there are confined within high walls, unable to increase their numbers due to the lack of additional homes. Moreover, they lack a designated place to dispose of waste, forcing them to discard it in the narrow streets. The situation worsens when there is no water in the Mellah, coinciding with the outbreak of Smallpox and fever, resulting in the death of a significant portion of the population<sup>118</sup>.

The same depiction is found in the writings of the British author Hugh Edward Millington Stutfield (d. 1929 AD), who chronicled his observations during his stay in Fez in his book titled «Elmaghreb: 1200 Miles Ride Through Marocco». He characterized the city's Mellah as dirty and squalid, portraying the Jews' appearance as profoundly miserable. They are confined within a neighborhood surrounded by a wall after sunset, with several doors that close in the evening. They are not allowed to leave it except barefoot, and some streets

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<sup>114</sup> Hugh E. M. Stutfield, *Elmaghreb: 1200 Miles Ride Through Marocco*, London, 1886, p.141.

<sup>115</sup> The Mellah of Marrakesh, as outlined in the novel by the Spanish researcher Julio Calvo-Serrano, is believed to have been established by Sultan Muhammad El-Sheikh E-Saadi, the first sultan of the Saadian states, during the mid-sixteenth century. However, the American researcher Emily Gottreich associates its founding with Sultan Abdullah el-Ghalib, who aimed to separate the Jewish population from the Muslim population by creating a distinct neighborhood for Jews. This occurred specifically between 1557 and 1560 AD. Julio Calvo-Serrano et al, op, cit, p.1325; Emily Gottreich, *The mellah of Marrakesh*, op, cit, pp.15-18; «On the Origins of the Mellah of Marrakesh», op, cit, pp.290-293.

<sup>116</sup> It was founded during the reign of the Marinid Sultan Abdul Haqq II in 1438 AD. Julio Calvo-Serrano et al, op, cit, p.1325.

<sup>117</sup> It was founded during the reign of the Alaouite Sultan Moulay Suleiman. Julio Calvo-Serrano et al, op, cit, p.1325.

<sup>118</sup> Lawrence Harris, op, cit, p.194.

are forbidden to them. Additionally, as per his view, they must wear a black cap and distinctive clothing, and entry into Jewish temples or public places of worship is prohibited. When addressing a Muslim, they are required to use the term «Sir» and display other forms of reverence and respect. Furthermore, they are prohibited from riding mules or horses, enduring mistreatment and daily humiliations, making their lives in this country a heavy burden<sup>119</sup>.

Similarly, British explorer James Richardson (d. 1851 AD) characterized the Jews of Demnat as having a bad and malicious nature<sup>120</sup>. The English journalist Walter Burton Harris (d. 1933 AD) echoed these ideas in his book «The Land of an African Sultan, Travels to Morocco 1887, 1888, and 1889». Harris described the Jews of Meknes as filthy. In one incident, a crowd of them approached the house in which he lived in the city of Meknes in a «humiliating» and disgusting manner, intending to sell him «inferior» antiques at exorbitant prices. In response, Harris instructed the guard soldiers not to allow them to enter. Furthermore, Harris referred to the Jewish Mellah<sup>121</sup> as a despicable neighborhood. The treatment of Jews by Muslims in Meknes is similar to that in

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119 Hugh E. M. Stutfield, *op, cit*, pp.95-96; Walter Burton Harris, *The Land of An African Sultan: Travels In Morocco 1887, 1888, and 1889*, London, 1889, p.133.

<sup>120</sup> James Richardson, *Travels in Morocco*, London, 1860, p.171.

<sup>121</sup> The mellah was founded in the city of Meknes in 1686 AD by the Alaouite Sultan Moulay Ismail. Julio Calvo-Serrano et al, *op, cit*, p.1325.

However, researcher Mohammed ELahiya dates its founding to the year 1682 AD, based on Al-Qadiri's narration. Nevertheless, Al-Qadiri's account only mentions the date of issuance of the Sultan's decision to evacuate the Jews from their homes, noting that the Sultan issued the decision in the month of June of the mentioned year. Therefore, according to Professor ELahiya, estimating the period required to build the Mellah after that is challenging. However, what is certain is that the Meknes Mellah was constructed under the supervision of the Jewish Sheikh Abraham Maamran, with the assistance of English and Portuguese Captives, in exchange for paying the price of their ransom to the Sultan. Mohammed ELahiya, *op, cit*, pp. 341-356.



Fez. Ironically, Harris added that the Jews did not complain about anything except the filth, which they appeared to enjoy<sup>122</sup>.

Likewise, the French artist George Montbard (d. 1905 AD) described them when he visited the city of Meknes in the 1890s. He recorded the following «This morning, on leaping out of bed..., Some Jews arrive. From underneath their black shabby garments they extract from dirty check handkerchiefs bracelets, silver collars, copper candlesticks, and importune us to buy at exorbitant prices these almost worthless articles»<sup>123</sup>. Montbard highlighted that they lived in a neighborhood called Mellah, characterized by crowded houses and dirty streets filled with waste, rotten vegetables, and decaying meat, emitting a foul odor. In some narrow alleys, merchants sell dirty, disgusting items, while despicable children gather immersing themselves in streams of stagnant water with dogs. Seated on the doorsteps of houses were Jewish women known for their obesity, adorned with kohl-rimmed eyes and wearing heavy earrings in their ears, adorned their feet, and other bracelets studded with stones gracing their wrists<sup>124</sup>.

In the early nineteenth century, the English physician John Buffa estimated that out of the one hundred thousand people constituting the total population of Meknes<sup>125</sup>, twenty-five thousand were Jews. They lived in a distinct, fortified

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<sup>122</sup> Walter Burton Harris, *op. cit.*, pp.83-84.

<sup>123</sup> George Montbard, *Among the Moors: Sketches of Oriental Life*, London, 1894, p.143.

<sup>124</sup> *Ibid.*, pp.148-149.

<sup>125</sup> American researcher Jessica Marglin confirms that the golden age of Meknes city was in the late seventeenth and early eighteenth centuries AD. However, the city's status quickly declined in favor of Fez at the end of the nineteenth century AD, and the number of the Jewish community there also significantly declined. By the beginning of the twentieth century, the Jewish population had decreased to six thousand people. Nevertheless, the city of Meknes remained a vital center of Moroccan Jewish life. Jessica Marglin, «Poverty and Charity in a Moroccan City: A Study of Jewish Communal Leadership in Meknes, 1750-1912». *The Convergence of Judaism and Islam: Religious, Scientific, and Cultural Dimensions*, University Press of Florida, 2011, pp. 300-301.

neighborhood, guarded by special forces under the supervision of the commander<sup>126</sup>.

The British geologist and explorer Joseph Thomson (d. 1895 AD) employed a similar approach when assessing the living conditions of the Jewish community in Demnat during the late nineteenth century. His observations, recorded in his book «*Travels in the Atlas and Southern Morocco: A Narrative of Exploration*», include several remarks about its Jewish inhabitants. He described them as living in dirty streets full of garbage<sup>127</sup>, portraying them as miserable. They did not have a private neighborhood known as the Mellah, but it seemed to be under construction. As for the women, they wore dirty Abayas, were obese, and their appearance was deemed disgusting. He concluded his remarks by saying «though all the Mellahs are abominably filthy, that of Demnat is in that respect far ahead of any other I have seen»<sup>128</sup>.

Harris admits that he was greatly affected at first by the suffering of the Jews in Morocco and showed sincere compassion for them, much like other travelers who visited Morocco before him. However, he confirms that his view of them quickly changed. Eventually, he realized that there were no people more corrupt, less respectable, and more willing to steal and plunder than the Moroccan Jews. Nevertheless, he ultimately admits that he received good treatment from some Moroccan Jews, from whom he learned a lot regarding the history of Morocco<sup>129</sup>.

What further indicates the excessive harshness in assessing the conditions of the Jews in the Atlas is what the British explorer and botanist Joseph Dalton (d. 1911 AD) recorded in his book titled «*Journal of a Tour in Morocco and the Great Atlas*». When discussing the Jewish quarter in the city of Marrakesh, he

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<sup>126</sup> John Buffa, [Travels Through the Empire of Morocco](#), London, 1810, p.162

<sup>127</sup> Joseph Thomson, *Travels in the Atlas and Southern Morocco: A Narrative of Exploration*, London 1889, p.145.

<sup>128</sup> *Ibid*, p.157,159.

<sup>129</sup> Burton Harris, *op, cit*, p.132.



described it as a dirty neighborhood<sup>130</sup>. Additionally, when speaking with excessive superiority about the Jews of the village of «Mesfioua»<sup>131</sup>, he recounted an incident from the winter of 1878 AD. During their preparation to cross the Atlas Mountains, a group of «miserable» Jews warmly welcomed him and his companions, offering various supplies such as oil, wine, hot pepper, and sweets. He found the appearance of the Jews' cakes disgusting, and the wine horrible, especially when served in an old tin teapot. Unable to eat anything, he and his companions informed the Jews that they couldn't drink from the indescribably disgusting old pot. In response, a Jewish woman lifted her skirt and began cleaning the cup to the satisfaction of the guests<sup>132</sup>.

And what Budgett Meakin noted in his book «Life in Morocco», where he acknowledged that Muslims' treatment of Jews in the land of the Atlas is likened to their treatment of dogs. He described a relationship marked by hatred and animosity between the two sides. Meakin portrayed the Jew as a despised yet indispensable individual, subject to harassment but still prosperous. According to him, the Jew could prevail over his opponent in matters of justice if wealthier, refrained from bearing witness against a Muslim, and dared not raise his hand against him, regardless of the severity of mistreatment. Nevertheless, the Jew sought revenge on his enemy through dealing with usury<sup>133</sup>.

Likewise, in his study of «The Jews of Morocco», when he talked about Jewish synagogues, he described them as despicable neighborhoods, recording the following: «I have visited many, but they have a wearsome sameness, I speak now of the the typical ones with no reference to the fine modern buildings erected by public or by private liberality in some of the coast towns, as for instance the new synagogues in tangier wall, nest door to my home, or that of the

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<sup>130</sup> Joseph Dalton Hooker, *op. cit.* p.157.

<sup>131</sup> It is a mountainous Berber village situated in the central part of Morocco, currently part of the Al Haouz province.

<sup>132</sup> Joseph Dalton Hooker, *op. cit.* p.169.

<sup>133</sup> Budgett Meakin, *Life in Morocco and Glimpses Beyond*, London, 1905, pp.16-17.

Messrs.Nahon, close by»<sup>134</sup>. He continued, «Several of these synagogues are small with labyrinthine entrances, some passing through dwellings, and distressingly odoriferous...., in other towns the condition of things is often very much worse, the house of prayer serving also to sleep, eat, and kill chichhkens in, not to mention ccooking and trade. I never saw more neglected places in actual use than in Marrakesh (Morocco city) and Amizmiz, the latter on the slopes of the Atlas»<sup>135</sup>.

It is evident from the passage above that British Orientalist writings displayed significant prejudice against the Jews of the Atlas. These writings went to great lengths to diminish their value and social status, relegating them to an inferior position and describing them with slanderous depictions. This bias indicates a deviation from the path of objectivity, seriousness, and honesty in conveying the news of this authentic Hebrew-Moroccan component. Perhaps this bias is a result of the influence, common among Europeans in the nineteenth century, of the theory of the centrality of the civilized West and the categorization of other groups as «marginalized», «savage», and «backward», unworthy of occupying a central role. Reading the introductions of the aforementioned writings reveals the extent of the prejudice against Morocco and its society, with expressions such as «the Moors», «barbarians», «savages», «illiterates», and «Ignorant People»<sup>136</sup>. Undoubtedly, these writings, preceding the occupation of Morocco, were actively promoting in Western circles a perception of a «Barbaric» and «Chaotic» Morocco, where its inhabitants—Muslims and Jews—were deemed «Savage»; therefore, European governments were convinced to

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<sup>134</sup> Budgett Meakin, «The Jews of Morocco.....»,op,cit,pp.384-385.

<sup>135</sup> Budgett Meakin, *The Moors: A Comprehensive Description*op, cit, p.439; «The Jews of Morocco»,op, cit, ,p.385

<sup>136</sup> For example, you may refer to the introduction of the book: Lawrence Harris, op, cit, p. Vi.

And also refer to the author:

,*The Pillars of Hercules, Or, A Narrative of Travels in Spain and Morocco in* [David Urquhart](#) 1848, V II, London, 1850, p.266.



intervene with the aim of bringing Morocco into the circle of civilization, progress, and prosperity.

It must be noted that there are English writings that did not align with colonial perspectives, such as the work of the British traveler and explorer John Davidson (d. 1836) titled «Notes Taken During Travels in Africa». In this work, he mentioned his observations about the Jewish quarter (Mellah)<sup>137</sup> in the city of Rabat, stating: «We went to the Millah to see the Jews' quarters. There are some fine houses, and beautiful women»<sup>138</sup>. Regarding the reality of life for the Jews of the High Atlas, he noted that they live in «an atmosphere of freedom and challenge»<sup>139</sup>.

And the travel book by the American journalist, diplomat, and translator Stephen Bonsal (d. 1951), titled «Morocco As It Is: With an Account of Sir Charles Euan Smith's Recent Mission to Fez». In this book, he acknowledged that the early Atlas Jews followed the path of searching for wealth. While it was believed that they would not assimilate and mingle with the local population, their descendants now live in complete peace and harmony with each other. They can now read Hebrew, have access to some sacred writings, and preserve their religion in its original form and content<sup>140</sup>.

In a similar context, the British captain George Robert Beauclerk (d. 1871) expressed explicitly in his work «A Journey to Marocco in 1826» that the Jews in Morocco are a model of sincerity. It is impossible to find better men and more angelic women than these people. However, these people are exposed to persecution by Muslims who teach their children from a young age the ways and means of attacking the Jews. Simultaneously, he acknowledged being captivated

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<sup>137</sup> It was founded during the reign of the Alaouite Sultan Moulay Suleiman. Julio Calvo-Serrano et al, op, cit, p.1325.

<sup>138</sup> John Davidson, Notes Taken During Travels in Africa, London, 1839, p.27.

<sup>139</sup> Ibid, p.59.

<sup>140</sup> Stephen Bonsal, op, cit, p.314.

by the local virtues of this remarkable community while praising their ways of life<sup>141</sup>.

The British writer, politician, and journalist Robert Bontine Cunninghame Graham (d. 1936) explicitly discussed the Jews of the Atlas in his book titled «Mogreb-el-Acksa: A Journey in Morocco». He specifically mentioned the Jews of the village of Imintanout, describing them as diligent individuals whose appearance resembled Europeans. According to him, they excelled in commercial affairs over both Arabs and Berbers<sup>142</sup>. While on his way to the village of Amzmiz<sup>143</sup>, he encountered several Jews, exchanged greetings with them, and noticed signs of joy and happiness on their faces. He mentioned that all the Jews there could read and write, appreciating their good appearance and wonderful black eyes<sup>144</sup>.

Even journalist Budgett Meakin, who had previously spoken harshly about the Jews of the Atlas, later admitted in his book «The Moors: A Comprehensive Description» that the Jews endured brutal persecution in Christian Europe. They found refuge and tranquility under the rule of Moroccan sultans, who welcomed them after expulsions from Italy in 1342 AD, the Netherlands in 1380 AD, France around 1403 AD, England in 1422 AD, Portugal in 1496 AD, and Spain during the years 1391 AD, 1414 AD, 1492 AD, and 1610 AD. Immediately after their expulsion from Spain, many Jews sailed on a Spanish fleet to the Moroccan coast, particularly to the city of Asilah, which was a «Christian» settlement. From there, they moved to the city of Fez, where a large number of their brethren resided. In fact, with their significant numbers, they succeeded in making the city of Fez a major center for Judaism<sup>145</sup>.

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<sup>141</sup> George Robert Beauclerk, *op. cit.*, p.279-281

<sup>142</sup> Robert Bontine Cunninghame Graham, *Mogreb-el-Acksa: A Journey in Morocco*, London, 1898, p.84.

<sup>143</sup> It is an Amazigh village located 117 km west of Marrakesh, administratively belonging to the Chichaoua district.

<sup>144</sup> Robert Bontine Cunninghame Graham, *op. cit.*, p.117,108.

<sup>145</sup> Budgett Meakin, *The Moors: A Comprehensive Description*, *op. cit.*, pp. 452-453.



This narrative is strongly supported by the researcher Abdullah Hussein in his author «The Jewish Question», where he discusses the various forms of persecution suffered by European Jews, especially in Germany during the 11th century AD. In this period, Emperor Henry II (d. 1024) expelled Jews from Mainz and other places, and persecution continued against them in the subsequent centuries. In France, their properties were confiscated by order of King Louis VII (d. 1180), and they lived a miserable life in Russia, being viewed as outcasts. In England, they endured hardships during the reign of Richard the Lionheart (d. 1199), as well as in other European countries<sup>146</sup>. Perhaps these indicators, among others, were a major reason for the successive migrations of Jews to North Africa, especially to Morocco, which welcomed them and provided reasons for protection and security.

As for the Scottish writer, politician, and diplomat David Urquhart (d. 1877), he denied that the Jews of the Atlas worked for the benefit of the Makhzen (the Moroccan government) or for individuals without pay, stressing that they substituted the payment of tribute with labor instead of paying it in money. He also mentioned that they had access to sacred books, temples, and rabbis, and they freely practiced their religious rituals. This contradicts what was stated by the author Edward Millington Stufield, who wrote about them with excessive cruelty<sup>147</sup>. David, at the same time, emphasized that he had met several Jews in the city of Marrakech, specifically at the home of a Jewish man named Yacoub, who hosted him during his visit to the Red City. He found all of them to be vibrant, intelligent individuals filled with vitality and contentment<sup>148</sup>.

The American researcher, Emily Gottreich, confirmed that Jews and Muslims in Marrakesh lived side by side, contributing jointly to revitalizing economic activity both inside and outside the Mellah. This resulted from the organic economic connection between Jewish and Islamic spaces, as the Mellah

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<sup>146</sup> Abdullah Hussein, *The Jewish Question*, Hindawi Foundation for Education and Culture Publications, Cairo, 2012, pp. 113-120.

<sup>147</sup> David Urquhart, op, cit, p.268.

<sup>148</sup> *Ibid*, p.272.

and the city collectively served as markets for both communities. Muslims were attracted to purchasing Jewish goods within the Mellah and then reselling them in other parts of the city. Additionally, Muslims established significant commercial relationships with the butchers in the Mellah. Muslims did not only come to the Mellah for buying purposes, but also to showcase their goods and services. Muslim porters, water sellers, and beggars became familiar sights in the Mellah. Furthermore, many Muslims owned real estate properties within the Mellah, constituting approximately 10% of the total houses in the Jewish quarter by the year 1890. Most of these properties were rented to Jews. The establishment of the Universal Israelite Alliance's<sup>149</sup> school in Marrakech in the winter of 1900-1901 played a significant role in bringing Jews and Muslims together. The school employed numerous Muslim guards and other assistants, with several Muslim students enrolling. Additionally, Muslims utilized the Jewish space, albeit to a lesser extent, for religious purposes—either to honor certain tombs of saints in the Jewish cemetery or to perform specific rituals there in their search for spouses<sup>150</sup>. All of this underscores that Muslims and Jews lived side by side in the Atlas region without any discrimination.

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<sup>149</sup> Founded in 1860 in the French city of Paris, it originated as an international Jewish organization with the primary mission of liberating the Jews of the Middle East and North Africa through a focus on modern Western education. The organization opened its inaugural school in Morocco in 1860 AD, specifically in the city of Tetouan. Aomar Boum, «Schooling in the Bled: Jewish Education and the Alliance Israélite Universelle in Southern Rural Morocco, 1830-1962», *Journal of Jewish Identities*, January 2010, 3(1),p.1; Jessica M. Marglin, *Across Legal Lines Jews and Muslims in Modern Morocco*, Yale University, 2016, p.210.

<sup>150</sup> Emily Gottreich, *The mellah of Marrakesh*, op, cit, pp.73-74; «On the Origins of the Mellah of Marrakesh», op,cit,p.298.



## Conclusion

*In summary, British travelers, writers, and others who visited Morocco before French colonialism were able to document many significant historical testimonies regarding the Mellahs in the cities and villages of the Atlas Mountains, as well as the living conditions of the Jews within them. These diverse testimonies intertwine history with geography, society with culture, and economics with politics. Despite its lack of objectivity and failure to encompass all historical truths, they remain valuable historical materials for researchers to enrich their academic studies. Despite its importance in historical studies, it still definitively needs criticism and examination, lest researchers be swayed by its unilateral orientations.*

*The Atlas Mellahs were mentioned in the pages of the aforementioned orientalists in an excessively arrogant and greatly exaggerated manner. In these descriptions, the Jewish population was portrayed in a very lowly way, inhabiting a dirty and filthy environment. These depictions and epithets reflect self-emotion, prejudices, ready-made images, and positions imbued with the theory of the centrality of the advanced West and the backward East, charged with the spirit of control and domination over all non-European peoples. Such European writings in general, which preceded the era of the French protectorate, were primarily aimed at serving the governments of European countries. It became clear from this historical stage that the reasons for power and survival led them to engage in expansion at the expense of what they considered a «backward margin».*

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## Rigidity of Composition Operators with Sum of Symbols on the Hardy Space $H^{1+\epsilon}$

**Dr. BUSHARA EISA HAHAD ABDALLA,**<sup>151</sup>

Assistant of Professor Mathematics, Department of Mathematics,  
White Nile University, Kosti, Sudan

### **Abstract:**

Given  $(\varphi_1 + \varphi_2)$  be sum of analytic maps taking the unit disk  $D$  into itself. We show follow [40] and establish that the class of composition operators  $f \rightarrow C_{(\varphi_1+\varphi_2)}(f) = f \circ (\varphi_1 + \varphi_2)$  exhibits a rather strong rigidity of non-compact behaviour on the Hardy space  $H^{1+\epsilon}$ , for  $0 \leq \epsilon < \infty$  and  $\epsilon \neq 1$ . The main result states that exactly one of the following alternatives holds: (i)  $C_{(\varphi_1+\varphi_2)}$  is a compact operator  $H^{1+\epsilon} \rightarrow H^{1+\epsilon}$ , (ii)  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of  $1 + \epsilon$  in  $H^{1+\epsilon}$ , but  $C_{(\varphi_1+\varphi_2)}$  does not fix any copies of 2 in  $H^{1+\epsilon}$ , (iii)  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of 2 in  $H^{1+\epsilon}$ . In case (iii) the operator  $C_{(\varphi_1+\varphi_2)}$  actually fixes a copy of  $L^{1+\epsilon}(0, 1)$  in  $H^{1+\epsilon}$  provided  $\epsilon > 0$ . We reinterpret these results in terms of norm-closed ideals of the bounded linear operators on  $H^{1+\epsilon}$ , which contain the compact operators  $(1 + \epsilon)(H^{1+\epsilon})$ . The class of composition operators on  $H^{1+\epsilon}$  does not reflect the quite complicated lattice structure of such ideals.

Keywords: Hardy space, Composition operator,  $\ell^{1+\epsilon}$ -singularity,  $\ell^2$ -singularity.

<sup>151</sup> [busharaeisa@gmail.com](mailto:busharaeisa@gmail.com)

### 1. Introduction and Preliminaries

For  $\mathbb{D} = \{z \in \mathbb{C} : |z| < 1\}$  be the unit disk in  $\mathbb{C}$ . For  $0 \leq \epsilon < \infty$  the analytic function  $f : \mathbb{D} \rightarrow \mathbb{C}$  belongs to the Hardy space  $H^{1+\epsilon}$  if

$$\|f\|_{1+\epsilon}^{1+\epsilon} = \sup_{0 \leq \epsilon < \infty} \int_{\mathbb{T}} |f((1 + \epsilon)\xi)|^{1+\epsilon} < \infty, \tag{1.1}$$

where  $T = \partial\mathbb{D}$  (identified with  $[0, 2\pi]$ ) and  $dm(e^{i(1+\epsilon)}) = \frac{d(1+\epsilon)}{2\pi}$ . Let  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  be sum of an analytic self-maps of  $\mathbb{D}$ . It is a well-known consequence of the Littlewood subordination principle, see [9, 3.1], that the composition operator

$$f \rightarrow C_{(\varphi_1+\varphi_2)}(f) = f \circ (\varphi_1 + \varphi_2)$$

is bounded  $H^{1+\epsilon} \rightarrow H^{1+\epsilon}$  for any  $(\varphi_1 + \varphi_2)$  as above. Properties of these composition operators have been studied very extensively during the last 40 years on various Banach spaces of analytic functions on  $\mathbb{D}$ , see [9] and [34] for comprehensive expositions of the early developments of the area. The compactness of  $C_{(\varphi_1+\varphi_2)}$  on  $H^{1+\epsilon}$  is well understood, and there are several equivalent characterizations. We recall that Shapiro [33] established that  $C_{(\varphi_1+\varphi_2)}$  is a compact operator  $H^{1+\epsilon} \rightarrow H^{1+\epsilon}$  if and only if

$$\lim_{|w| \rightarrow 1} \frac{N(\varphi_1 + \varphi_2, w)}{\log(1/|w|)} = 0. \tag{1.2}$$

Above  $N(\varphi_1 + \varphi_2, w)$  is the Nevanlinna counting function of  $(\varphi_1 + \varphi_2)$  defined by  $N(\varphi_1 + \varphi_2, w) = \sum_{z \in (\varphi_1+\varphi_2)^{-1}(w)} \log(1/|z|)$  for  $w \in (\varphi_1 + \varphi_2)(\mathbb{D})$  (counting multiplicities). Finer gradations of compactness were obtained e.g. by Luecking and Zhu [26], who characterized the membership of  $C_{(\varphi_1+\varphi_2)}$  in the Schatten  $(1 + \epsilon)$ -classes on  $H^2$ . Moreover, the approximation numbers of  $C_{(\varphi_1+\varphi_2)}$  on  $H^2$  were estimated in [19], [20] and [21], as well as on  $H^{1+\epsilon}$  in [22].

We demonstrate that composition operators on  $H^{1+\epsilon}$  only allow a small variety of qualitative non-compact behaviour compared to that of arbitrary bounded operators on  $H^{1+\epsilon}$  see [40]. Let  $E, E + \epsilon$  and  $X$  be Banach spaces. It will be convenient to say that the bounded linear operator  $U : E \rightarrow (E + \epsilon)$  fixes a copy of  $X$  in  $E$  if there is an infinite-dimensional subspace  $M \subset E, M$  linearly isomorphic to  $X$ , for which  $U|_M$  is bounded below on  $M$ , that is, there is  $\epsilon \geq 0$  so that  $\|Ux\| \geq (1 + \epsilon) \cdot \|x\|$  for all  $x \in M$ . We use the standard notation  $M \approx X$  for linearly isomorphic spaces  $M$  and  $X$ , see [1], [23] and [39] for general background related to the theory of Banach spaces.

The trichotomy contained in Theorem 1.1 below is the main result of this paper. Let  $E_{(\varphi_1+\varphi_2)} = \{e^{i(\theta_1^2+\theta_2^2)} : |(\varphi_1 + \varphi_2)(e^{i(\theta_1^2+\theta_2^2)})| = 1\}$  be the boundary contact set of the analytic maps  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$ . We use  $(\varphi_1 + \varphi_2)(e^{i(\theta_1^2+\theta_2^2)})$  to denote the a.e. radial limit



function of  $(\varphi_1 + \varphi_2)$  on  $\mathbb{T}$ . It is part of the trichotomy that (1.2) together with the simple condition

$$m(E_{(\varphi_1+\varphi_2)}) = 0 \tag{1.3}$$

completely determine the composition operators which fix copies of the subspace  $\ell^{1+\epsilon}$  or  $\ell^2$  in  $H^{1+\epsilon}$ . Recall that the known compactness results for  $C_{(\varphi_1+\varphi_2)}$  on  $H^2$  yield that (1.2) implies (1.3), but the class of symbols  $(\varphi_1 + \varphi_2)$  satisfying (1.3) is much larger than that of (1.2), see e.g. [34, Chap. 10] and see [40].

Below we exclude the Hilbert space  $H^2$ , where the situation is known and much simpler, since part (ii) does not occur for  $\epsilon = 1$  (cf. the discussion following Theorem 1.2). We use  $(1 + \epsilon)(E)$  to denote the class of compact operators  $E \rightarrow E$  for any Banach space  $E$ , and take into account the known characterization of the composition operators  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$  see [40].

**Theorem 1.1.** *Let  $0 \leq \epsilon < \infty, \epsilon \neq 1$ , and  $(\varphi_1 + \varphi_2)$  be sum of any analytic self-maps of  $D$ . Then there are three mutually exclusive alternatives:*

- (i)  $C_{(\varphi_1+\varphi_2)}$  is compact on  $H^{1+\epsilon}$ ,
- (ii)  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$ , but does not fix any copies of  $\ell^2$  in  $H^{1+\epsilon}$ ,
- (iii)  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of  $\ell^2$  (as well as of  $\ell^{1+\epsilon}$ ) in  $H^{1+\epsilon}$ . In this case, if  $0 < \epsilon < \infty$  and  $\epsilon \neq 1$ , then  $C_{(\varphi_1+\varphi_2)}$  also fixes a copy of  $L^{1+\epsilon}(0, 1)$  in  $H^{1+\epsilon}$ .

Furthermore, regarding the above alternatives

- (i) takes place if and only if Shapiro’s condition (1.2) holds,
- (ii) takes place if and only if (1.2) fails to hold but  $m(E_{(\varphi_1+\varphi_2)}) = 0$ ,
- (iii) takes place if and only if  $m(E_{(\varphi_1+\varphi_2)}) > 0$ .

In particular,  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$  if and only if  $C_{(\varphi_1+\varphi_2)}$  does not fix any copies of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$ .

Theorem 1.1 is obtained by combining Theorems 1.2, 1.4 and 1.5 stated below, which also contain more precise information. For this purpose we first recall some standard linear classes that classify the behaviour of non-compact operators. Let  $E, (E + \epsilon)$  and  $X$  be Banach spaces, and  $\mathcal{L}(E, E + \epsilon)$  be the space of bounded linear operators from  $E$  to  $(E + \epsilon)$ . The operator  $U \in \mathcal{L}(E, E + \epsilon)$  is called  $X$ -singular if  $U$  does not fix any copies of  $X$  in  $E$ . We denote

$$S_X(E, E + \epsilon) = \{U \in \mathcal{L}(E, E + \epsilon) : U \text{ is } X - \text{singular}\},$$

and put  $S_{1+\epsilon}(E, E + \epsilon) = \ell^{1+\epsilon}(E, E + \epsilon)$  to simplify our notation in the case of  $X = \ell^{1+\epsilon}$ . Recall further that  $U \in \mathcal{L}(E, E + \epsilon)$  is strictly singular, denoted by  $U \in S(E, E + \epsilon)$ , if  $U$  is not bounded below on any infinite-dimensional linear subspaces  $M \subset E$ . It is clear that  $(1 + \epsilon)(E, E + \epsilon) \subset S(E, E + \epsilon) \subset S_{1+\epsilon}(E, E + \epsilon)$  for any Banach spaces  $E$  and  $(E + \epsilon)$ , and it is known that the classes  $S(E, E + \epsilon)$  and  $S_{1+\epsilon}(E, E + \epsilon)$  define norm-closed operator ideals in the sense of Pietsch [29] for any  $0 \leq \epsilon \leq \infty$  (cf. [38, p. 289] for the case of  $S_{1+\epsilon}$ ).

Part of Theorem 1.1 is contained in the following dichotomy (see [40]), which we also relate to the known characterization of the compact composition operators on  $H^{1+\epsilon}$ .

**Theorem 1.2.** Let  $0 \leq \epsilon < \infty$  and let  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  be sum of any analytic maps. Then either  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$ , or else  $C_{(\varphi_1+\varphi_2)} \notin S_{1+\epsilon}(H^{1+\epsilon})$ . Equivalently,  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$  if and only if (1.2) does not hold.

The above theorem holds for  $\epsilon = 1$  because of the general fact due to Calkin that  $(1 + \epsilon)(H^2) = S(H^2) = S_2(H^2)$  for the Hilbert space  $H^2$ , see e.g. [29, 5.1–5.2]. For  $0 < \epsilon < \infty$  and  $\epsilon \neq 1$  one has that

$$S(H^{1+\epsilon}) = S_2(H^{1+\epsilon}) \cap S_{1+\epsilon}(H^{1+\epsilon}). \tag{1.4}$$

This follows from the characterization of  $S(L^{1+\epsilon})$  by Weis [38] combined with the well known fact that  $H^{1+\epsilon} \approx L^{1+\epsilon} \equiv L^{1+\epsilon}(0, 1)$ , see e.g. [24, 2.c.17]. By contrast, for  $\epsilon \neq 1$  all the inclusions

$$(1 + \epsilon)(H^{1+\epsilon}) \subsetneq S(H^{1+\epsilon}), S(H^{1+\epsilon}) \subsetneq S_2(H^{1+\epsilon}), S(H^{1+\epsilon}) \subsetneq S_{1+\epsilon}(H^{1+\epsilon}) \tag{1.5}$$

are strict. This is easily deduced from the facts that  $H^{1+\epsilon} \approx L^{1+\epsilon}$  contains complemented subspaces isomorphic to  $\ell^{1+\epsilon}$  and  $\ell^2$ , whereas any  $U \in \mathcal{L}(\ell^{1+\epsilon}, \ell^{1+2\epsilon})$  is strictly singular for  $\epsilon \neq 0$ , see e.g. [23, 2.c.3]. Thus Theorem 1.2 states that for  $\epsilon \neq 1$  the compactness of composition operators  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(H^{1+\epsilon})$  is a fairly rigid property as compared to (1.4) and (1.5) for arbitrary operators. It is also convenient to rephrase this as follows (see [40]):

**Corollary 1.3.** For  $0 \leq \epsilon < \infty$  the following conditions are equivalent for sum of any analytic maps  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$ :

- (i)  $(\varphi_1 + \varphi_2)$  satisfies (1.2),
- (ii)  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$ ,
- (iii)  $C_{(\varphi_1+\varphi_2)} \in S(H^{1+\epsilon})$ ,



(iv)  $C_{(\varphi_1+\varphi_2)} \in S_{1+\epsilon}(H^{1+\epsilon})$ .

The first result (excluding the case  $H^2$ ) in the direction of Theorem 1.2 and Corollary 1.3 is due to Sarason [31], who showed that  $C_{(\varphi_1+\varphi_2)}$  is weakly compact  $H^1 \rightarrow H^1$  if and only if it is compact. Jarchow [15, p. 95] pointed out that as a consequence  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^1)$  if and only if  $C_{(\varphi_1+\varphi_2)}$  is weakly conditionally compact on  $H^1$ , that is,  $C_{(\varphi_1+\varphi_2)} \in S_1(H^1)$  in view of Rosenthal’s  $\ell^1$ -theorem, see e.g. [23, 2.e.5]. Hence the case  $\epsilon = 0$  in Theorem 1.2 and Corollary 1.3 was known earlier. We refer to 4.1 for a list of further references to analogous rigidity results for composition operators on several (classical) Banach spaces of analytic functions on the unit disk  $\mathbb{D}$ .

The lattice structure of the operator norm-closed ideals of  $\mathcal{L}(H^{1+\epsilon}) \approx \mathcal{L}(L^{1+\epsilon})$  containing the compact operators is quite complicated for  $0 < \epsilon < \infty$  and  $\epsilon \neq 1$ , see e.g. [29, 5.3.9] and [32]. For instance,  $S_{1+\epsilon}(H^{1+\epsilon})$  and  $S_2(H^{1+\epsilon})$  are mutually incomparable classes, since  $H^{1+\epsilon} \approx L^{1+\epsilon}$  contains complemented copies of  $\ell^2$  and  $\ell^{1+\epsilon}$ . However, note that Corollary 1.3 implies that if  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(H^{1+\epsilon})$  fixes a copy of  $\ell^2$  in  $H^{1+\epsilon}$ , then  $C_{(\varphi_1+\varphi_2)}$  must also fix a copy of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$ . These facts raise the problem whether it is possible to explicitly determine the  $\ell^2$ -singular composition operators on  $H^{1+\epsilon}$ . It turns out in Theorem 1.4 below that condition (1.3) characterizes this class, thus providing a finer classification of the non-compact  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(H^{1+\epsilon})$  for  $0 \leq \epsilon < \infty$  and  $\epsilon \neq 1$ . We stress that Theorem 1.4 (as well as the subsequent Theorem 1.5) does not hold for  $H^2$  (see [40]).

**Theorem 1.4.** Let  $0 \leq \epsilon < \infty, \epsilon \neq 1$ , and  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  be sum of an analytic maps. Then  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of  $\ell^2$  in  $H^{1+\epsilon}$  if and only if  $m(E_{(\varphi_1+\varphi_2)}) > 0$ . Equivalently,  $C_{(\varphi_1+\varphi_2)} \in S_2(H^{1+\epsilon})$  if and only if (1.3) holds. Cima and Matheson [7] have shown that (1.3) characterizes the completely continuous composition operators  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(H^1)$ . As a significant strengthening of Theorem 1.4 we are further able to show that for  $\epsilon > 0$  (and  $\epsilon \neq 1$ ) condition (1.3) actually describes the operators  $C_{(\varphi_1+\varphi_2)}$  which belong to the class  $S_{L^{1+\epsilon}}(H^{1+\epsilon})$ . Here  $S_{L^{1+\epsilon}}(H^{1+\epsilon})$  is the maximal non-trivial ideal of  $\mathcal{L}(H^{1+\epsilon})$ , see [10, p. 103]. To state the relevant result let  $h^{1+\epsilon}$  be the harmonic Hardy space consisting of the harmonic functions  $f : \mathbb{D} \rightarrow \mathbb{C}$  normed by (1.1).

**Theorem 1.5.** Let  $0 < \epsilon < \infty, \epsilon \neq 1$ , and  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  be sum of an analytic maps. Then the following conditions are equivalent:

- (i)  $(\varphi_1 + \varphi_2)$  satisfies  $m(E_{(\varphi_1+\varphi_2)}) = 0$ ,
- (ii)  $C_{(\varphi_1+\varphi_2)} \in S_{L^{1+\epsilon}}(H^{1+\epsilon})$ , that is,  $C_{(\varphi_1+\varphi_2)}$  does not fix any copies of  $L^{1+\epsilon}$  in  $H^{1+\epsilon}$ ,

$$(iii) C_{(\varphi_1+\varphi_2)} \in S_{L^{1+\epsilon}}(h^{1+\epsilon}),$$

$$(iv) C_{(\varphi_1+\varphi_2)} \in S_2(H^{1+\epsilon}).$$

The proof of Theorem 1.2 is given in Section 2. The argument is based on explicit perturbation estimates, where the starting point is a known test function reformulation of the compactness criterion (1.2). The proofs of Theorems 1.4 and 1.5 are contained in Section 3. Although these results are connected, we have stated them separately, since the argument for the  $\ell^2$ -singularity in  $H^{1+\epsilon}$  also holds for  $\epsilon = 0$ . By contrast the proof of Theorem 1.5 relies on properties of  $h^{1+\epsilon} = L^{1+\epsilon}(T, m)$  for  $0 < \epsilon < \infty$ , and it depends on the non-trivial fact due to Dosev et al. [10] that the class  $S_{L^{1+\epsilon}}(L^{1+\epsilon}) \approx S_{L^{1+\epsilon}}(h^{1+\epsilon})$  is additive. Section 4 contains a number of further comments and open problems. As an application of Section 3 we characterize the  $\ell^2$ -singular compositions  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(VMOA)$ . As an additional motivation we also indicate a connection between a weaker version of Corollary 1.3 and a general extrapolation result [14] for operators on  $L^{1+\epsilon}$ -spaces (see [40]).

A starting point was a question by Jonathan Partington about the strict singularity of composition operators on  $H^{1+\epsilon}$  for  $\epsilon \neq 1$ . We are indebted to Manuel González, Francisco Hernández and Dmitry Yakubovich for timely questions towards Theorems 1.4 and 1.5.

**2. Proof of Theorem 1.1.** For  $a^2 \in \mathbb{D}$  and fixed  $0 \leq \epsilon < \infty$  let

$$g_{a^2}(z) = \left( 1 - \frac{|a^2|^2}{(1 - \bar{a}^2 z)^2} \right)^{\frac{1}{1+\epsilon}}, \quad z \in \mathbb{D}.$$

Observe that if  $\gamma_{a^2}(z) = \frac{(1 - |a^2|^2)^{\frac{1}{1+\epsilon}}}{1 - \bar{a}^2 z}$  is the normalized reproducing kernel of  $H^2$  associated to  $a^2 \in \mathbb{D}$ , then  $|g_{a^2}(z)|^{1+\epsilon} = |\gamma_{a^2}(z)|^2$  for  $z \in \mathbb{D}$ , so that  $\|g_{a^2}\|_{1+\epsilon} = 1$ . The proof of Theorem 1.2 is based on the following criterion:  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$  if and only if

$$\lim_{|a^2| \rightarrow 1} \sup \|C_{(\varphi_1+\varphi_2)}(g_{a^2})\|_{1+\epsilon} = 0. \tag{2.1}$$

This is a restatement using the test functions  $(g_{a^2}) \subset H^{1+\epsilon}$  of a well-known characterization of the compact operators  $C_{(\varphi_1+\varphi_2)} \in \mathcal{L}(H^{1+\epsilon})$  in terms of vanishing Carleson pull-back measures, see [9, Thm. 3.12.(2)] (such a characterization was first obtained by Mac Cluer [27] in the case of  $H^{1+\epsilon}(B_N)$  for  $N > 1$ , where  $B_N$  is the open Euclidean ball in  $C_N$ ). Alternatively, (2.1) is stated explicitly for  $\epsilon = 1$  in e.g. [33, 5.4], whereas the compactness of  $C_{(\varphi_1+\varphi_2)} : H^{1+\epsilon} \rightarrow H^{1+\epsilon}$  is independent of  $0 \leq \epsilon < \infty$  e.g. by [9, Thm. 3.12.(2)]. Note that the compactness



criterion (1.2) plays no explicit role, as we will mostly use condition (2.1). After these preparations we proceed to the proof itself (see [40]).

**Proof of Theorem 1.2.** Suppose that  $C_{(\varphi_1+\varphi_2)} \notin (1+\epsilon)(H^{1+\epsilon})$ , where  $0 \leq \epsilon < \infty$ . We will show by an explicit perturbation argument that  $C_{(\varphi_1+\varphi_2)}$  fixes a linearly isomorphic copy of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$ . Since condition (2.1) fails there is  $\epsilon \geq 0$  and a sequence  $(a_n^2) \subset \mathbb{D}$  so that  $|a_n^2| \rightarrow 1$  as  $n \rightarrow \infty$  and

$$\|C_{(\varphi_1+\varphi_2)}(g_{a_n^2})\|_{1+\epsilon} \geq \epsilon \geq 0 \tag{2.2}$$

for all  $n \in \mathbb{N}$ . We may further assume without loss of generality that  $a_n^2 \rightarrow 1$  as  $n \rightarrow \infty$ . Namely, we may pass to a convergent subsequence in  $\mathbb{D}$  and compose  $(\varphi_1 + \varphi_2)$  with a suitable rotation of  $\overline{\mathbb{D}}$  that defines a linear isomorphism of  $H^{1+\epsilon}$ . The starting point is the phenomenon that  $(g_{a_n^2})$  admits subsequences which are small perturbations of a disjointly supported sequence in  $L^{1+\epsilon}(T, m)$ , and hence span an isomorphic copy of  $\ell^{1+\epsilon}$ . The crux of the argument is that this can be achieved simultaneously for further subsequences of  $(C_{(\varphi_1+\varphi_2)}(g_{a_n^2}))$ , and the following claim actually contains the basic step of the argument (see [40]):

**Claim 2.1.** There is a further subsequence of  $(a_n^2)$ , still denoted by  $(a_n^2)$  for simplicity, for which there are constants  $\epsilon > 0$  so that

$$\begin{aligned} (1+\epsilon) \cdot \|(b_j^2)\|_{\rho^{1+\epsilon}} &\leq \left\| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right\|_{1+\epsilon} \\ &\leq (1+2\epsilon) \cdot \|(b_j^2)\|_{\rho^{1+\epsilon}} \text{ for all } (b_j^2) \in \ell^{1+\epsilon}. \end{aligned} \tag{2.3}$$

Assuming Claim 2.1 momentarily, the proof of Theorem 1.2 is completed by using this claim a second time (formally in the case where  $(\varphi_1 + \varphi_2)(z) = z$  for  $z \in \mathbb{D}$ ) to extract a further subsequence of  $(g_{a_n^2})$ , still denoted by  $(g_{a_n^2})$ , so that

$$\begin{aligned} (1+\epsilon) \cdot \|(b_j^2)\|_{\rho^{1+\epsilon}} &\leq \left\| \sum_{j=1}^{\infty} b_j^2 g_{a_j^2} \right\|_{1+\epsilon} \leq (1+2\epsilon) \cdot \|(b_j^2)\|_{\rho^{1+\epsilon}} \text{ for all } (b_j^2) \\ &\in \ell^{1+\epsilon}, \end{aligned} \tag{2.4}$$

for suitable constants  $\epsilon \geq 0$ . Then by combining (2.3) and (2.4) we get

$$\left\| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right\|_{1+\epsilon} \geq (1+\epsilon) \|(b_j^2)\|_{p^{1+\epsilon}} \geq \left(\frac{1+\epsilon}{1+2\epsilon}\right) \left\| \sum_{j=1}^{\infty} b_j^2 g_{a_j^2} \right\|_{1+\epsilon},$$

so that the restriction of  $C_{(\varphi_1+\varphi_2)}$  defines a linear isomorphism  $M \rightarrow C_{(\varphi_1+\varphi_2)}(M)$ , where  $M = \text{span}\{g_{a_j^2} : j \in \mathbb{N}\} \approx \ell^{1+\epsilon}$ .

Let  $A = \{\xi \in T : \text{the radial limit } (\varphi_1 + \varphi_2)(\xi) \text{ exists}\}$  and

$$E_\epsilon = \{\xi \in A : |(\varphi_1 + \varphi_2)(\xi) - 1| < \epsilon\}$$

for  $\epsilon > 0$ . Recall that  $\mathbb{T} \setminus A$  has measure zero. The proof of Claim 2.1 is an argument of gliding hump type based on the following auxiliary observation (see [40]).

**Lemma 2.2.** Let  $(\varphi_1 + \varphi_2)$  and  $(g_{a_n^2})$  be as above, where  $a_n^2 \rightarrow 1$  as  $n \rightarrow \infty$ . Then

$$(L1) \int_{\mathbb{T} \setminus E_\epsilon} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\epsilon} dm \rightarrow 0 \text{ as } n \rightarrow \infty \text{ for each fixed } \epsilon > 0,$$

$$(L2) \int_{E_\epsilon} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\epsilon} dm \rightarrow 0 \text{ as } \epsilon \rightarrow 0 \text{ for each fixed } n \in \mathbb{N}.$$

**Proof.** Observe first that

$$\int_{E_\epsilon} |C_{(\varphi_1+\varphi_2)}(g)|^{1+\epsilon} dm \rightarrow 0$$

as  $\epsilon \rightarrow 0$  for any  $g \in H^{1+\epsilon}$ , since  $\bigcap_{\epsilon>0} E_\epsilon = \{\xi \in A : (\varphi_1 + \varphi_2)(\xi) = 1\}$  has measure 0 as  $(\varphi_1 + \varphi_2)$  is not identically 1. Moreover, if  $\epsilon > 0$  is fixed and  $\xi \in A \setminus E_\epsilon$ , then there is  $n_\epsilon$  such that

$$\begin{aligned} \left| 1 - \overline{a_n^2}(\varphi_1 + \varphi_2)(\xi) \right| &= \left| 1 - (\varphi_1 + \varphi_2)(\xi) + (\varphi_1 + \varphi_2)(\xi) \left( 1 - \overline{a_n^2} \right) \right| \\ &\geq |1 - (\varphi_1 + \varphi_2)(\xi)| - |1 - a_n^2| > \frac{\epsilon}{2} \end{aligned}$$

for all  $n \geq n_\epsilon$ . It follows that

$$|C_{(\varphi_1+\varphi_2)}(g_{a_n^2})(\xi)|^{1+\epsilon} = \frac{1 - |a_n^2|^2}{\left| 1 - \overline{a_n^2}(\varphi_1 + \varphi_2)(\xi) \right|^2} \leq \frac{4(1 - |a_n^2|^2)}{\epsilon^2},$$

so that (L1) holds as  $n \rightarrow \infty$ .



To continue the argument of Claim 2.1 recall that  $\int_{\mathbb{T}} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\epsilon} dm \geq (1 + \epsilon)^{1+\epsilon} > 0$  by condition (2.2). We may then use Lemma 2.2 inductively to find indices  $j_1 < j_2 < \dots$  and a decreasing sequence  $\epsilon_j > \epsilon_{j+1} \rightarrow 0$  so that

$$(i) \left( \int_{E_{\epsilon_n}} |C_{(\varphi_1+\varphi_2)}(g_{a_{j_k}^2})|^{1+\epsilon} dm \right)^{\frac{1}{1+\epsilon}} < 4^{-n} \delta (1 + \epsilon) \text{ for all } k = 1, \dots, n - 1,$$

$$(ii) \left( \int_{\mathbb{T} \setminus E_{\epsilon_n}} |C_{(\varphi_1+\varphi_2)}(g_{a_{j_n}^2})|^{1+\epsilon} dm \right)^{\frac{1}{1+\epsilon}} < 4^{-n} \delta (1 + \epsilon),$$

$$(iii) \left( \int_{E_{\epsilon_n}} |C_{(\varphi_1+\varphi_2)}(g_{a_{j_n}^2})|^{1+\epsilon} dm \right)^{\frac{1}{1+\epsilon}} > \frac{1+\epsilon}{2}$$

for all  $n \in \mathbb{N}$ . Here  $\delta > 0$  is a small enough constant (to be chosen later). In fact, suppose that we have already found  $a_{j_1}^2, \dots, a_{j_{n-1}}^2$  and  $\epsilon_1 > \dots > \epsilon_{n-1}$  satisfying (i)–(iii). Then property (L2) from Lemma 2.2 yields  $\epsilon_n < \epsilon_{n-1}$  such that

$$\left( \int_{E_{\epsilon_n}} |C_{(\varphi_1+\varphi_2)}(g_{a_{j_k}^2})|^{1+\epsilon} dm \right)^{\frac{1}{1+\epsilon}} < 4^{-n} \delta (1 + \epsilon)$$

for each  $k = 1, \dots, n - 1$ . After this use property (L1) from Lemma 2.2 together with (2.2) to find an index  $j_n > j_{n-1}$  so that conditions (ii) and (iii) are satisfied for the set  $E_{\epsilon_n}$ .

In the interest of notational simplicity we relabel  $a_{j_n}^2$  as  $a_n^2$  for  $n \in \mathbb{N}$ . The idea of the argument is that the sequence  $(C_{(\varphi_1+\varphi_2)}(g_{a_n^2}))$  essentially resembles disjointly supported peaks in  $L^{1+\epsilon}(T, m)$  close to the point 1. We will next verify the left-hand inequality in (2.3) by a direct perturbation argument. Let  $b = (b_j^2) \in \ell^{1+\epsilon}$  be arbitrary. Our starting point will be the identity

$$\left\| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right\|_{1+\epsilon}^{1+\epsilon} = \sum_{n=0}^{\infty} \int_{E_{\epsilon_n} \setminus E_{\epsilon_{n+1}}} \left| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right|^{1+\epsilon} dm, \quad (2.5)$$

where we set  $E_{\epsilon_0} = T$ .

Observe first that for each  $n \in \mathbb{N}$  we get that

$$\begin{aligned} & \left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} \\ &= \left( \int_{E_{\varepsilon_n}} |C_{(\varphi_1+\varphi_2)}(g_n)|^{1+\varepsilon} dm - \int_{E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} \\ &> \left( \left(\frac{1+\varepsilon}{2}\right)^{1+\varepsilon} - (4^{-n-1}\delta(1+\varepsilon))^{1+\varepsilon} \right)^{\frac{1}{1+\varepsilon}} \geq \frac{1+\varepsilon}{2} - 4^{-n-1}\delta(1+\varepsilon) \end{aligned}$$

in view of (i) and (iii), where the last estimate holds because  $0 \leq \varepsilon$ . Moreover, note that

$$\left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_j^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} < 2^{-n-j} \delta(1+\varepsilon)$$

for all  $j \neq n$ . In fact,  $\left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_j^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}}$  is dominated by  $4^{-n}\delta(1+\varepsilon)$  for  $j_n$  in view of (i) and (ii). Thus we get from the triangle inequality in  $L^{1+\varepsilon}$ , together with the preceding estimates, that for all  $n \in \mathbb{N}$  one has

$$\begin{aligned} & \left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} \left| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} \\ & \geq |b_n^2| \left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_n^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} \\ & \quad - \sum_{j \neq n} |b_j^2| \left( \int_{E_{\varepsilon_n} \setminus E_{\varepsilon_{n+1}}} |C_{(\varphi_1+\varphi_2)}(g_{a_j^2})|^{1+\varepsilon} dm \right)^{\frac{1}{1+\varepsilon}} \\ & \geq |b_n^2| \left( \frac{1+\varepsilon}{2} - 4^{-n-1}\delta(1+\varepsilon) \right) - 2^n \delta(1+\varepsilon) \|b\|_{1+\varepsilon} \geq \frac{1+\varepsilon}{2} - 2^{-n+1}\delta(1+\varepsilon) \|b\|_b. \end{aligned}$$

By summing over  $n$  we get from the disjointness and the triangle inequality in  $\ell^{1+\varepsilon}$  that

$$\left\| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right\|_{1+\varepsilon} \geq \left( \sum_{n=1}^{\infty} \left| \frac{1+\varepsilon}{2} |b_n^2| - 2^{-n+1}\delta(1+\varepsilon) \|b\|_{1+\varepsilon} \right|^{1+\varepsilon} \right)^{\frac{1}{1+\varepsilon}}$$



$$\begin{aligned} &\geq \frac{1 + \epsilon}{2} \left( \sum_{n=1}^{\infty} |b_n^2|^{1+\epsilon} \right)^{\frac{1}{1+\epsilon}} - \delta(1 + \epsilon) \|b\|_{1+\epsilon} \left( \sum_{n=1}^{\infty} 2^{(-n-1)} \right)^{\frac{1}{1+\epsilon}} \\ &(1 + \epsilon) \left( \frac{1}{2} - \delta \cdot (1 - 2^{1+\epsilon})^{-\frac{1}{1+\epsilon}} \right) \|b\|_{1+\epsilon} \geq \frac{1 + \epsilon}{4} \|b\|_{1+\epsilon}, \end{aligned}$$

Note that: By combining (2.3) and (2.4) we have

$$(i) \left\| \sum_{j=1}^{\infty} b_j^2 C_{(\varphi_1+\varphi_2)}(g_{a_j^2}) \right\|_{1+\epsilon} = \left\| \sum_{j=1}^{\infty} b_j^2 g_{a_j^2} \right\|_{1+\epsilon} \geq \frac{1 + \epsilon}{2} - 4^{-(n+1)} \delta(1 + \epsilon)$$

Note that:

$$(ii) \left\| \sum_{j=1}^{\infty} b_j^2 g_{a_j^2} \right\|_{1+\epsilon}^{1+\epsilon} \geq \frac{1 + \epsilon}{2} - 4^{-(n+1)} \delta(1 + \epsilon)$$

$$(iii) \left\| \sum_{j=1}^{\infty} b_j^2 g_{a_j^2} \right\|_{1+\epsilon} \geq \frac{1 + \epsilon}{4} \|b\|_{1+\epsilon}$$

(iv) By combining (ii) and (iii) we get

$$\|b\|_{1+\epsilon} \geq \left( 2 - 4^{-n} \frac{\delta(1 + \epsilon)}{1 + \epsilon} \right)$$

where the last estimate holds once we choose  $\delta > 0$  small enough, so that  $\delta \cdot (1 - 2^{1+\epsilon})^{-\frac{1}{1+\epsilon}}$ . The proof of the right-hand inequality in (2.3) is a straightforward variant of the preceding estimates. This inequality does not affect the choice of  $\delta > 0$ , and hence the details will be omitted here.

**Remark 2.3.** The definitions of the classes  $(1 + \epsilon)(H^{1-\epsilon}), S(H^{1-\epsilon})$  and  $S_{1-\epsilon}(H^{1-\epsilon})$  also make sense in the range  $\epsilon < 1$ , where  $H^{1-\epsilon}$  are only quasi-Banach spaces. The composition operators  $C_{(\varphi_1+\varphi_2)}$  are continuous on  $H^{1-\epsilon}$  for  $\epsilon < 1$ , and Theorem 1.2 as well as Corollary 1.3 remain true here. The argument is similar to the above, but the quasi-norms  $\| \cdot \|_{1-\epsilon}$  in  $H^{1-\epsilon}$  as well as in  $(1 - \epsilon)$  are only  $(1 - \epsilon)$ -norms, that is,  $\|f + g\|_{1-\epsilon}^{1-\epsilon} \leq \|f\|_{1-\epsilon}^{1-\epsilon} + \|g\|_{1-\epsilon}^{1-\epsilon}$  for  $f, g \in H^{1-\epsilon}$ . This will affect a few constants when applying the triangle inequalities as in the proof of Theorem 1.2. However, we leave the precise details for  $\epsilon < 1$  to the interested reader, since a full analogue of Theorem 1.1 appears out of reach. In fact,  $H^{1-\epsilon}$  and  $L^{1-\epsilon}$  are not

isomorphic for  $\epsilon < 1$  (see e.g. [17, p. 35]), the structure of their respective subspaces differs (see e.g. [17, Chapter 3.2]), and no version of (1.4) appears known (see [40]).

**Remark 2.4.** It is possible to ensure in the proof of Theorem 1.2 that the subspaces  $M = \overline{\text{span}}\{g_{\alpha_j^2} : j \in \mathbb{N}\}$  and  $C_{(\varphi_1+\varphi_2)}(M)$  are both complemented in  $H^{1+\epsilon}$  (this also follows from the general result in [38] for  $0 < \epsilon < \infty$ ). For this one uses the fact that the closed linear span of a disjointly supported sequence is complemented in  $L^{1+\epsilon}(T, m)$ , a classical perturbation argument (cf. [23, 1.a.9]), as well as the complementation of  $H^{1+\epsilon} \subset L^{1+\epsilon}(T, m)$  for  $0 < \epsilon < \infty$ . Note also that for  $\epsilon = 0$  the argument of Theorem 1.2 provides an alternative route to the weak compactness characterization of Sarason [31] cited in Section 1. In fact, if  $C_{(\varphi_1+\varphi_2)} \notin (1 + \epsilon)(H^1)$ , then  $C_{(\varphi_1+\varphi_2)}$  fixes a copy of the non-reflexive space  $l$  by Theorem 1.2, whence  $C_{(\varphi_1+\varphi_2)}$  is not a weakly compact operator  $H^1 \rightarrow H^1$ .

### 3. Proof of Theorems 1.4 and 1.5

The proof of Theorem 1.4 is contained in the following three results (see [40]). We first look separately at the case  $\epsilon = 1$ . Recall our notation  $E_{(\varphi_1+\varphi_2)} = \{e^{i(\theta_1^2+\theta_2^2)} : |(\varphi_1 + \varphi_2)(e^{i(\theta_1^2+\theta_2^2)})| = 1\}$  for analytic maps  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$ .

**Lemma 3.1.** Suppose that condition (1.3) fails, that is,  $m(E_{(\varphi_1+\varphi_2)}) > 0$ . Then there exist integers  $0 \leq n_1 < n_2 < \dots$  and a constant  $\epsilon \geq 0$  such that

$$(1 + \epsilon)^{-1} \cdot \|1 + \epsilon\|_{\ell^2} \leq \left\| \sum_{k=0}^{\infty} (1 + \epsilon)_k (\varphi_1 + \varphi_2)^{n_k} \right\|_2 \leq (1 + \epsilon) \cdot \|1 + \epsilon\|_{\ell^2}$$

for all  $1 + \epsilon = ((1 + \epsilon)_{1+2\epsilon}) \in \ell^2$ .

**Proof.** The upper estimate follows from the boundedness of  $C_{(\varphi_1+\varphi_2)}$  on  $H^2$  and the orthonormality of the sequence  $(z_n)$  in  $H^2$ .

To establish the lower estimate, note that  $z_n \rightarrow 0$  weakly and therefore also  $(\varphi_1 + \varphi_2)_n = C_{(\varphi_1+\varphi_2)}(z_n) \rightarrow 0$  weakly in  $H^2$  as  $n \rightarrow \infty$ . Hence we may set  $n_1 = 0$  and then proceed inductively to pick increasing indices  $n_{1+2\epsilon}$  such that the inner-products satisfy  $|(\varphi_1 + \varphi_2)^{n_{1+\epsilon}}, (\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}| \leq 2^{-2(1+2\epsilon)} m(E_{(\varphi_1+\varphi_2)})$  for all  $\epsilon > 0$  and each  $(1 + 2\epsilon) \in \mathbb{N}$ . Let  $1 + \epsilon = ((1 + \epsilon)_{1+2\epsilon}) \in \ell^2$  be arbitrary and note that



$$\begin{aligned} & \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+2\epsilon} (\varphi_1 + \varphi_2)^{n_{1+2\epsilon}} \right\|_2^2 \\ &= \sum_{\epsilon=0}^{\infty} |(1 + \epsilon)_{1+2\epsilon}|^2 \|(\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}\|_2^2 \\ &+ 2\operatorname{Re} \sum_{\epsilon=0}^{\infty} \sum_{\epsilon=0}^{2\epsilon} (1 + \epsilon)_{1+\epsilon} \overline{(1 + \epsilon)_{1+2\epsilon}} ((\varphi_1 + \varphi_2)^{n_{1+\epsilon}}, (\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}). \end{aligned}$$

Obviously  $\|(\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}\|_2^2 \geq \int_{E_{(\varphi_1+\varphi_2)}} |(\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}|^2 dm = m(E_{(\varphi_1+\varphi_2)})$  for each  $1 + 2\epsilon$ . Moreover, we get that

$$\begin{aligned} & \sum_{\epsilon=0}^{\infty} \sum_{\epsilon=0}^{2\epsilon} (1 + \epsilon)_{1+\epsilon} \overline{(1 + \epsilon)_{1+2\epsilon}} ((\varphi_1 + \varphi_2)^{n_{1+\epsilon}}, (\varphi_1 + \varphi_2)^{n_{1+2\epsilon}}) \\ & \leq \|1 + \epsilon\|_{\ell^2}^2 \sum_{\epsilon=0}^{\infty} \sum_{\epsilon=0}^{2\epsilon} 2^{-2(1+2\epsilon)} m(E_{(\varphi_1+\varphi_2)}) \\ & \leq \frac{1}{2} \|1 + \epsilon\|_{\ell^2}^2 m(E_{(\varphi_1+\varphi_2)}) \sum_{\epsilon=0}^{\infty} \sum_{\epsilon=0}^{2\epsilon} 2^{-2(1+2\epsilon)} = \frac{1}{6} \|1 + \epsilon\|_{\ell^2}^2 m(E_{(\varphi_1+\varphi_2)}) \end{aligned}$$

By combining these estimates we obtain the desired lower bound

$$\begin{aligned} & \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+2\epsilon} (\varphi_1 + \varphi_2)^{n_{1+2\epsilon}} \right\|_2^2 \geq \|1 + \epsilon\|_{\ell^2}^2 m(E_{(\varphi_1+\varphi_2)}) - \frac{1}{3} \|1 + \epsilon\|_{\ell^2}^2 m(E_{(\varphi_1+\varphi_2)}) \\ &= \left( \frac{2}{3} m(E_{(\varphi_1+\varphi_2)}) \right) \|1 + \epsilon\|_{\ell^2}^2. \end{aligned}$$

In order to treat general  $0 \leq \epsilon < \infty$  recall that the analytic maps  $f: \mathbb{D} \rightarrow \mathbb{C}$  belongs to BMOA if

$$|f|_* = \sup_{a^2 \in \mathbb{D}} \|f \circ \sigma_{a^2} - f(a^2)\|_2 < \infty,$$

where  $\sigma_{a^2}(z) = \frac{a^2 - z}{1 - \overline{a^2}z}$  is the Möbius-automorphism of  $\mathbb{D}$  interchanging 0 and  $a^2$  for  $a^2 \in \mathbb{D}$ .

The Banach space BMOA is normed by  $\|f\|_{BMOA} = |f(0)| + |f|_*$ . Moreover, VMOA is the closed subspace of BMOA, where  $f \in VMOA$  if

$$\lim_{|a^2| \rightarrow 1} \|f \circ \sigma_{a^2} - f(a^2)\|_2 = 0.$$

We refer to e.g. [12] and [13] for background on BMOA. It follows readily from Littlewood’s subordination theorem that  $C_{(\varphi_1+\varphi_2)}$  is bounded  $BMOA \rightarrow BMOA$  for sum of any analytic maps  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$ , see e.g. [5, p. 2184].

The following proposition establishes one implication of Theorem 1.4 (see [40]).

**Proposition 3.2.** *Let  $0 \leq \epsilon < \infty$  and suppose that  $m(E_{(\varphi_1+\varphi_2)}) > 0$ . Then there exist increasing integers  $0 \leq n_1 < n_2 < \dots$  such that the subspace*

$$M = \overline{\text{span}}\{z^{n_{1+\epsilon}} : \epsilon \geq 0\} \subset H^{1+\epsilon}$$

is isomorphic to  $\ell^2$  and the restriction  $C_{(\varphi_1+\varphi_2)}|_M$  is bounded below on  $M$ . Hence  $C_{(\varphi_1+\varphi_2)} \notin S_2(H^{1+\epsilon})$ .

**Proof.** We start by choosing the increasing integers  $(n_{1+\epsilon})$  as in Lemma 3.1. By passing to a subsequence we may also assume that  $(z^{n_{1+\epsilon}})$  is a lacunary sequence, that is,  $\inf_{1+\epsilon} (n_{2+\epsilon}/n_{1+\epsilon}) > 1$ . Paley’s theorem (see e.g. [11, p. 104]) implies that for  $0 \leq \epsilon < \infty$  the sequence  $(z^{n_{1+\epsilon}})$  is equivalent in  $H^{1+\epsilon}$  to the unit vector basis of  $\ell^2$ , that is,

$$\left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} z^{n_{1+\epsilon}} \right\|_{1+\epsilon} \sim \|1 + \epsilon\|_{\ell^2} \tag{3.1}$$

for all  $1 + \epsilon = ((1 + \epsilon)_{1+\epsilon}) \in \ell^2$ . (Here, and in the sequel, we use  $\sim$  as a short-hand notation for the equivalence of the respective norms.) Case  $\epsilon \geq 0$ . By Hölder’s inequality and Lemma 3.1 we have that

$$\begin{aligned} \left\| C_{(\varphi_1+\varphi_2)} \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} z^{n_{1+\epsilon}} \right\|_{2+\epsilon} &= \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{2+\epsilon} \\ &\geq \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_2 \sim \|1 + \epsilon\|_{\ell^2}. \end{aligned}$$

According to (3.1) and the boundedness of  $C_{(\varphi_1+\varphi_2)}$  this proves the claim for  $\epsilon \geq 0$ .

Case  $0 \leq \epsilon < 1$ . We start by invoking a version of Paley’s theorem for BMOA (see e.g. [13, Sec. 9]), which together with the boundedness of  $C_{(\varphi_1+\varphi_2)}$  on BMOA ensures that

$$\begin{aligned} \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{BMOA} &= \|C_{(\varphi_1+\varphi_2)}\| \cdot \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} z^{n_{1+\epsilon}} \right\|_{BMOA} \\ &\leq (1 + \epsilon) \cdot \|C_{(\varphi_1+\varphi_2)}\| \cdot \|1 + \epsilon\|_{\ell^2} \end{aligned}$$



for all  $1 + \epsilon = ((1 + \epsilon)_{1+\epsilon}) \in \ell^2$  and a uniform constant  $\epsilon \geq 0$ . In view of Fefferman's  $H^1 - BMOA$  duality pairing (see e.g. [13, Sec. 7]) we may further estimate

$$\begin{aligned} \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{BMOA} &= \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_1 \\ &\leq \left\| \left( \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}}, \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right) \right\| \\ &= \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_2^2 \sim \|1 + \epsilon\|_{\ell^2} \end{aligned}$$

where we again use Lemma 3.1 at the final step. By applying Hölder's inequality and combining the preceding estimates we obtain that

$$\begin{aligned} \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{1+\epsilon} &\geq \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_1 \\ &\geq (1 + \epsilon) \|1 + \epsilon\|_{\ell^2} \end{aligned}$$

for some uniform constant  $\epsilon \geq 0$ . In particular,  $C_{(\varphi_1+\varphi_2)} \notin S_2(H^{1+\epsilon})$  in view of (3.1), which completes the verification of the proposition for  $0 \leq \epsilon < 1$ .

The converse implication in Theorem 1.4 is contained in the following

**Proposition 3.3.** Let  $0 \leq \epsilon < \infty, \epsilon \neq 1$ , and suppose that  $m(E_{\varphi_1+\varphi_2}) = 0$ . If  $(f_n)$  is any normalized sequence in  $H^{1+\epsilon}$  which is equivalent to the unit vector basis of  $\ell^2$ , then  $C_{(\varphi_1+\varphi_2)}$  is not bounded below on  $\overline{\text{span}}\{f_n : n \in \mathbb{N}\} \subset H^{1+\epsilon}$ . In particular,  $C_{(\varphi_1+\varphi_2)} \in S_2(H^{1+\epsilon})$ .

**Proof.** Assume to the contrary that

$$\left\| \sum_{n=1}^{\infty} (1 + \epsilon)_n C_{(\varphi_1+\varphi_2)}(f_n) \right\|_{1+\epsilon} \sim \left\| \sum_{n=1}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{1+\epsilon} \sim \|1 + \epsilon\|_{\ell^2} \tag{3.2}$$

for all sequences  $1 + \epsilon = ((1 + \epsilon)_n) \in \ell^2$ . In particular,  $C_{(\varphi_1+\varphi_2)}(f_n)^{1+\epsilon} \geq 1 + \epsilon > 0$  for all  $n$  and some constant  $1 + \epsilon$ . We write  $E_{1+\epsilon} = \{e^{i(\theta_1^2+\theta_2^2)} : |(\varphi_1 + \varphi_2)(e^{i(\theta_1^2+\theta_2^2)})| \geq \frac{\epsilon}{1+\epsilon}\}$  for  $\epsilon \geq 0$ . Since  $\lim_{\epsilon \rightarrow \infty} m(E_{1+\epsilon}) = m(E_{(\varphi_1+\varphi_2)}) = 0$ , we get that

$$\lim_{\epsilon \rightarrow \infty} \int_{\mathbb{T} \setminus E_{1+\epsilon}} E_{1+\epsilon} |C_{(\varphi_1+\varphi_2)}(f_n)|^{1+\epsilon} dm = 0 \text{ for all } n.$$

On the other hand,  $f_n \rightarrow 0$  weakly in  $H^{1+\epsilon}$  and hence  $f_n \rightarrow 0$  uniformly on compact subsets of  $\mathbb{D}$  as  $n \rightarrow \infty$ . This implies that

$$\lim_{n \rightarrow \infty} \int_{\mathbb{T} \setminus E_{1+\epsilon}} |C_{(\varphi_1+\varphi_2)}(f_n)|^{1+\epsilon} dm = 0 \text{ for all } 1 + \epsilon.$$

By using the above properties and proceeding recursively in a fashion similar to the argument for Theorem 1.2 in Section 2 we find increasing sequences of integers  $0 \leq n_1 < n_2 < \dots$  and  $0 = \epsilon < 2\epsilon < \dots$ , such that

$$\begin{aligned} & \left\| \sum_{n=1}^{\infty} (1 + \epsilon)_n C_{(\varphi_1+\varphi_2)}(f_n) \right\|_{1+\epsilon}^{1+\epsilon} \\ &= \sum_{l=1}^{\infty} \int_{E_{(1+\epsilon)_l} \setminus E_{2+\epsilon}} \left| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_n C_{(\varphi_1+\varphi_2)}(f_n) \right|^{1+\epsilon} dm \sim \|1 + \epsilon\|_{\ell^2} \end{aligned}$$

holds for all  $1 + \epsilon = ((1 + \epsilon)_{1+\epsilon}) \in \ell^{1+\epsilon}$  with uniform constants. However, for  $\epsilon \neq 1$  such estimates obviously contradict (3.2). Thus  $C_{(\varphi_1+\varphi_2)} \in S_2(H^{1+\epsilon})$ , and this completes the proof of the proposition (and hence also of Theorem 1.4).

We remind that Theorem 1.4 does not hold for  $\epsilon = 1$ . For  $\epsilon \neq 1$ , the result easily yields very explicit examples of operators  $C_{(\varphi_1+\varphi_2)} \in S_2(H^{1+\epsilon}) \setminus S_{1+\epsilon}(H^{1+\epsilon})$  (see [40]).

**Example 3.4.** Let  $(\varphi_1 + \varphi_2)(z) = \frac{1}{2}(1 + z)$  for  $z \in \mathbb{D}$ . Theorem 1.4 implies that  $C_{(\varphi_1+\varphi_2)}$  does not fix any copies of  $\ell^2$  in  $H^{1+\epsilon}$ . On the other hand, it is well known that  $C_{(\varphi_1+\varphi_2)} \notin (1 + \epsilon)(H^{1+\epsilon})$ , see e.g. [34, Sec. 2.5], so that  $C_{(\varphi_1+\varphi_2)}$  does fix copies of  $\ell^{1+\epsilon}$  in  $H^{1+\epsilon}$  by Theorem 1.2.

We next prepare for the proof of Theorem 1.5. This involves the harmonic Hardy space  $h^{1+\epsilon}$ , that is, the space of complex-valued harmonic functions  $f : \mathbb{D} \rightarrow \mathbb{C}$  normed by (1.1). Recall that for  $0 < \epsilon < \infty$  there is a well-known isometric identification  $h^{1+\epsilon} = L^{1+\epsilon}(T, m)$  as a complex Banach space. Here  $f \in h^{1+\epsilon}$  corresponds to its a.e. radial limit function  $f \in L^{1+\epsilon}(T, m)$ , whereas conversely  $g \in L^{1+\epsilon}(T, m)$  determines its harmonic extension  $P[g] \in h^{1+\epsilon}$  through the Poisson integral. Moreover,  $h^{1+\epsilon} = H^{1+\epsilon} \oplus \overline{H_0^{1+\epsilon}}$ , where  $\overline{H_0^{1+\epsilon}} = \{f \in H^{1+\epsilon} : f(0) = 0\}$  and  $H_0^{1+\epsilon} = \{f : f \in H_0^{1+\epsilon}\}$ .



Let  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  be sum of any analytic maps. The Littlewood subordination theorem for subharmonic functions (see e.g. [9, Thm. 2.22]) implies that the composition operator  $f \rightarrow f \circ (\varphi_1 + \varphi_2)$  is also bounded  $h^{1+\epsilon} \rightarrow h^{1+\epsilon}$  for  $0 \leq \epsilon < \infty$ . It will be convenient in the argument to use the notation  $\tilde{C}_{(\varphi_1+\varphi_2)}(f) = f \circ (\varphi_1 + \varphi_2)$  for  $f \in h^{1+\epsilon}$  to distinguish the composition operator on  $h^{1+\epsilon}$  from its relative on  $H^{1+\epsilon}$ . In particular, if in addition  $(\varphi_1 + \varphi_2)(0) = 0$ , then we may decompose

$$\begin{aligned} \tilde{C}_{(\varphi_1+\varphi_2)} &= \begin{pmatrix} C_{(\varphi_1+\varphi_2)} & 0 \\ 0 & C_{(\varphi_1+\varphi_2)} \end{pmatrix} \tilde{C}_{(\varphi_1+\varphi_2)}(f, g) \\ &= (f \circ (\varphi_1 + \varphi_2), g \circ (\varphi_1 + \varphi_2)), \end{aligned} \tag{3.3}$$

as a matrix direct sum with respect to the decomposition  $h^{1+\epsilon} = H^{1+\epsilon} \oplus \overline{H_0^{1+\epsilon}}$ . Here  $(\varphi_1 + \varphi_2)(0) = 0$  ensures that  $g \circ (\varphi_1 + \varphi_2) \in H_0^{1+\epsilon}$  for any  $g \in H_0^{1+\epsilon}$ .

**Proof of Theorem 1.5.** We may assume during the proof that  $(\varphi_1 + \varphi_2)(0) = 0$ . In fact, otherwise consider  $\psi = \sigma_{(\varphi_1+\varphi_2)}(0) \circ (\varphi_1 + \varphi_2)$ , where  $\sigma_{(\varphi_1+\varphi_2)}(0) : \mathbb{D} \rightarrow \mathbb{D}$  is the automorphism interchanging 0 and  $(\varphi_1 + \varphi_2)(0)$ . Then  $\psi(0) = 0$  and  $\tilde{C}_\psi = \tilde{C}_{(\varphi_1+\varphi_2)} \circ \tilde{C}_{\sigma_{(\varphi_1+\varphi_2)}(0)}$ , where  $\tilde{C}_{\sigma_{(\varphi_1+\varphi_2)}(0)}$  is a linear isomorphism  $h^{1+\epsilon} \rightarrow h^{1+\epsilon}$  (as well as  $H^{1+\epsilon} \rightarrow H^{1+\epsilon}$ ), which does not affect any of the claims of the theorem.

The proof of the implication (iii)  $\Rightarrow$  (i) is contained in the following claim.

**Claim 3.5.** Let  $0 < \epsilon < \infty$  and suppose that  $m(E_{(\varphi_1+\varphi_2)}) > 0$ . Then  $\tilde{C}_{(\varphi_1+\varphi_2)} \notin S_{L^{1+\epsilon}}(h^{1+\epsilon})$ , that is, there is a subspace  $M \subset h^{1+\epsilon}, M \approx L^{1+\epsilon}$ , such that  $\tilde{C}_{(\varphi_1+\varphi_2)}|_M$  is bounded below.

To prove the claim define the Borel measure  $\nu$  on  $\mathbb{T}$  by  $\nu(A) = m((\varphi_1 + \varphi_2)^{-1}(A))$ . Then  $\nu$  is absolutely continuous: if  $A \subset \mathbb{T}$  is a Borel set and  $u_A = P[\chi_A]$  is the harmonic extension (i.e. the Poisson integral) of  $\chi_A$ , we have that

$$\begin{aligned} \nu(A) &= \int_{(\varphi_1+\varphi_2)^{-1}(A)} dm \leq \int_{\mathbb{T}} u_A \circ (\varphi_1 + \varphi_2) dm = u_A((\varphi_1 + \varphi_2)(0)) = u_A(0) \\ &= m(A). \end{aligned}$$

Since  $\nu(\mathbb{T}) = m(E_{(\varphi_1+\varphi_2)}) > 0$ , it follows that the density  $d\nu/dm \geq \delta$  for some  $\delta > 0$  on a Borel set  $E + \epsilon \subset \mathbb{T}$  of positive Lebesgue measure.

We may now choose  $M = L^{1+\epsilon}(E + \epsilon, m)$ . Indeed, given any  $f \in L^{1+\epsilon}(E + \epsilon, m)$ , we have

$$\begin{aligned} \|\tilde{C}_{(\varphi_1+\varphi_2)}f\|_{L^{1+\epsilon}}^{1+\epsilon} &\geq \int_{E_{(\varphi_1+\varphi_2)}} |f \circ (\varphi_1 + \varphi_2)|^{1+\epsilon} dm = \int_{\mathbb{T}} |f|^{1+\epsilon} dv \\ &\geq \delta \int_{E+\epsilon} |f|^{1+\epsilon} dm = \delta \|f\|_{L^{1+\epsilon}(E+\epsilon, m)}^{1+\epsilon}, \end{aligned}$$

which establishes Claim 3.5, since  $L^{1+\epsilon}(E + \epsilon, m) \approx L^{1+\epsilon}$ .

The implication (ii)  $\Rightarrow$  (iii) follows from (3.3) and the non-trivial result that the class  $S_{L^{1+\epsilon}}(L^{1+\epsilon}) \approx S_{L^{1+\epsilon}}(h^{1+\epsilon})$  is additive, see [10, p. 103 and 105]. In fact, if  $C_{(\varphi_1+\varphi_2)} \in S_{L^{1+\epsilon}}(H^{1+\epsilon})$ , then

$$\tilde{C}_{(\varphi_1+\varphi_2)} = \begin{pmatrix} C_{(\varphi_1+\varphi_2)} & 0 \\ 0 & C_{(\varphi_1+\varphi_2)} \end{pmatrix} + \begin{pmatrix} 0 & C_{(\varphi_1+\varphi_2)} \\ C_{(\varphi_1+\varphi_2)} & 0 \end{pmatrix}$$

is the sum of two operators from  $S_{L^{1+\epsilon}}(h^{1+\epsilon})$ , and hence  $L^{1+\epsilon}$ -singular by additivity. Here one applies the observation that if  $M \subset L^{1+\epsilon}$  is a subspace isomorphic to  $L^{1+\epsilon}$ , then  $\{f : f \in M\}$  is also linearly isomorphic to  $L^{1+\epsilon}$ .

Finally, the proof of the implication (i)  $\Rightarrow$  (ii) is already contained in that of Proposition 3.3. In fact, if there is a subspace  $M \subset H^{1+\epsilon}, M \approx L^{1+\epsilon}$ , so that  $C_{(\varphi_1+\varphi_2)}$  is an isomorphism  $M \rightarrow C_{(\varphi_1+\varphi_2)}(M)$ , then  $C_{(\varphi_1+\varphi_2)}$  also fixes the isomorphic copies of  $\ell^2$  contained in  $M$ . It was shown in Proposition 3.3 that the latter property is incompatible with condition (i) of Theorem 1.5.

We note that Claim 3.5 also holds for  $\epsilon = 0$ . However, there is no immediate analogue of Theorem 1.5 for  $H^1$ . In fact,  $S_{L^1}(H^1) = L(H^1)$ , since  $L^1$  does not embed isomorphically into  $H^1$ , see e.g. [23, 1.d.1]. In conclusion, recall that there are infinitely many norm-closed ideals  $I$  of  $L(H^{1+\epsilon})$  satisfying  $S_2(H^{1+\epsilon})I \subset S_{L^{1+\epsilon}}(H^{1+\epsilon})$  for  $0 < \epsilon < \infty$  and  $\epsilon \neq 1$ , see [29, 5.3.9]. By contrast, Theorems 1.4 and 1.5 imply that there is no corresponding gradation for composition operators on  $H^{1+\epsilon}$ . In some cases the trichotomy of Theorem 1.1 can be sharpened by combining with known results about the subspaces of  $H^{2+\epsilon} \approx L^{2+\epsilon}$ . For instance, for  $0 < \epsilon < \infty$  it follows from a result of Johnson and Odell [16, Thm. 1] that if  $C_{(\varphi_1+\varphi_2)}|_M$  is bounded below on an infinite-dimensional subspace  $M \subset H^{2+\epsilon}$  that contains no isomorphic copies of  $\ell^2$ , then  $M$  embeds isomorphically into  $(2 + \epsilon)$ , whence  $C_{(\varphi_1+\varphi_2)} \notin S_{2+\epsilon}(H^{2+\epsilon})$ .

#### 4. Concluding Remarks and Questions

We list some further examples of Banach spaces of analytic functions where composition operators have related rigidity properties, and draw attention to open problems.



We also sketch another approach towards Theorem 1.2 which motivated this paper, though its conclusion is much weaker (see [40]).

#### 4.1. Further Rigidity Properties

The weaker rigidity property

$$C_{(\varphi_1+\varphi_2)} \in S(E) \text{ if and only if } C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(E) \tag{4.1}$$

holds for many other Banach spaces  $E$  of analytic functions on  $D$  apart from the Hardy spaces. The following list briefly recalls some cases. Typically these results were not stated in terms of strict singularity, and as a rule they do not yield as precise information as our results for  $H^{1+\epsilon}$  [40].

- The following dichotomy in [4, Thm. 1] is an explicit precursor of Theorem 1.2: either  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H_v^\infty)$  or  $C_{(\varphi_1+\varphi_2)} \notin S_\infty(H_v^\infty)$ . Here  $H_v^\infty$  is the weighted  $H^\infty$ -space for a strictly positive weight function  $v$  on  $\mathbb{D}$ . It is also possible to deduce versions of (4.1) for  $H^\infty$  (the case  $v \equiv 1$ ) from even earlier results. In fact, it follows from any of the references [37], [3] or [8] that  $C_{(\varphi_1+\varphi_2)} \in L(H^\infty)$  is weakly compact if and only if  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(H^\infty)$ . Moreover, Bourgain [6] established that  $W(H^\infty, X) = S_\infty(H^\infty, X)$  for any Banach space  $X$ , where  $W$  denotes the class of weakly compact operators. Here  $(1 + \epsilon)(H^\infty)S(H^\infty)$ , since this holds for the complemented subspace  $\ell^\infty$  of  $H^\infty$ .

- The dichotomy in Theorem 1.2 holds for arbitrary bounded operators on the Bergman space  $A^{1+\epsilon}$ . In fact,  $A^{1+\epsilon} \approx 1 + \epsilon$  for  $0 \leq \epsilon < \infty$  by a result of Lindenstrauss and Pełczyński, see [39, Thm. III.A.11], whereas  $S(\ell^{1+\epsilon}) = S_{1+\epsilon}(\ell^{1+\epsilon}) = (1 + \epsilon)(\ell^{1+\epsilon})$  by a result of Gohberg, Markus and Feldman, see [29, 5.1–5.2].

- It is known that the Bloch space  $B$  is isomorphic to  $\ell^\infty$ , while  $C_{(\varphi_1+\varphi_2)} \in W(B)$  if and only if  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(B)$ , see e.g. [25, Cor. 5]. Moreover, any  $U \notin W(\ell^\infty, X)$  fixes a copy of  $\ell^\infty$  for any Banach space  $X$ , see [23, 2.f.4]. Consequently either  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(B)$  or  $C_{(\varphi_1+\varphi_2)} \notin S_\infty(B)$ .

- It follows from [18, Section 3] that  $C_{(\varphi_1+\varphi_2)} \in (1 + \epsilon)(BMOA)$  if and only if  $C_{(\varphi_1+\varphi_2)} \in S_{(1+\epsilon)_0}(BMOA)$ . In fact, the argument shows that if  $C_{(\varphi_1+\varphi_2)} \notin (1 + \epsilon)(BMOA)$ , then there is  $M \subset VMOA, M \approx (1 + \epsilon)_0$ , so that  $C_{(\varphi_1+\varphi_2)}|_M$  is bounded below. Here again  $(1 + \epsilon)(BMOA) \subsetneq S_{(1+\epsilon)_0}(BMOA)$ , since  $BMOA$  contains complemented subspaces isomorphic to  $\ell^2$  in view of Paley’s theorem (see e.g. [13, Thm. 9.2]).

Actually the results of Section 3 combined with [18] lead to a better understanding of the  $\ell^2$ -singular composition operators on VMOA and BMOA.

**Proposition 4.1.** (i) If  $(\varphi_1 + \varphi_2) : \mathbb{D} \rightarrow \mathbb{D}$  is sum of an analytic maps, and  $C_{(\varphi_1 + \varphi_2)} \in S_2(BMOA)$ , then (1.3) holds (that is,  $m(E_{(\varphi_1 + \varphi_2)}) = 0$ ).

(ii) If  $(\varphi_1 + \varphi_2) \in VMOA$ , then  $C_{(\varphi_1 + \varphi_2)} \in S_2(VMOA)$  if (and only if) (1.3) holds.

**Proof.** (i) The argument is essentially contained in that of Proposition 3.2. In fact, suppose that  $m(E_{(\varphi_1 + \varphi_2)}) > 0$ , where  $E_{(\varphi_1 + \varphi_2)} = \{e^{i(\theta_1^2 + \theta_2^2)} : |(\varphi_1 + \varphi_2)(e^{i(\theta_1^2 + \theta_2^2)})| = 1\}$ . Then the proof of the case  $0 \leq \epsilon < 1$  of Proposition 3.2 gives a lacunary sequence  $(n_{1+\epsilon})$  and constants  $\epsilon > 0$  so that in the  $H^1 - BMOA$  duality pairing

$$\left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_{BMOA} \geq \left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \right\|_1 \geq (1 + \epsilon) \cdot \|1 + \epsilon\|_{\ell^2}$$

as well as  $\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} (\varphi_1 + \varphi_2)^{n_{1+\epsilon}} \|_1 \geq (1 + 2\epsilon) \cdot \|1 + \epsilon\|_{\ell^2}$  for all  $1 + \epsilon = ((1 + \epsilon)_{1+\epsilon}) \in \ell^2$ . Since  $C_{(\varphi_1 + \varphi_2)}$  is bounded on BMOA it follows as before from Paley's theorem in BMOA that  $C_{(\varphi_1 + \varphi_2)}$  is bounded below on  $\overline{\text{span}}\{z^{n_{1+\epsilon}} : (1 + \epsilon) \in \mathbb{N}\} \approx 2$  in BMOA.

(ii) Recall that  $C_{(\varphi_1 + \varphi_2)} : VMOA \rightarrow VMOA$  if  $(\varphi_1 + \varphi_2) \in VMOA$ , see e.g. [5, Prop. 2.3]. Assume that  $m(E_{(\varphi_1 + \varphi_2)}) = 0$  and suppose to the contrary that there is a normalised sequence  $(f_{1+\epsilon}) \subset VMOA$  equivalent to the unit vector basis of 2, for which

$$\left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} C_{(\varphi_1 + \varphi_2)}(f_{1+\epsilon}) \right\|_{BMOA} \sim \cdot \|1 + \epsilon\|_{\ell^2}$$

for all  $(1 + \epsilon) = ((1 + \epsilon)_{1+\epsilon}) \in \ell^2$ . In particular,  $\|f_{1+\epsilon} \circ (\varphi_1 + \varphi_2)\|_{BMOA} \geq 1 + \epsilon > 0$  for all  $(1 + \epsilon)$ , while  $(f_{1+\epsilon})$  is weak-null sequence in VMOA, so that  $f_{1+\epsilon} \rightarrow 0$  uniformly on compact subsets of  $\mathbb{D}$  as  $\epsilon \rightarrow \infty$ . Moreover, by the John–Nirenberg inequality there is a uniform constant  $\epsilon \geq 0$  so that

$$\|f_{1+\epsilon} \circ (\varphi_1 + \varphi_2)\|_4 \leq (1 + \epsilon) \|f_{1+\epsilon} \circ (\varphi_1 + \varphi_2)\|_{BMOA}, \quad (1 + \epsilon) \in \mathbb{N}.$$

Let  $E_{(1+\epsilon)} = \{e^{i(\theta_1^2 + \theta_2^2)} : |(\varphi_1 + \varphi_2)(e^{i(\theta_1^2 + \theta_2^2)})| \geq \frac{\epsilon}{1+\epsilon}\}$  for  $(1 + \epsilon) \in \mathbb{N}$ . From the above estimates and Hölder's inequality we get that



$$\begin{aligned} \|f_n \circ (\varphi_1 + \varphi_2)\|_2^2 &= E_{(1+\epsilon)} |f_n \circ (\varphi_1 + \varphi_2)|^2 dm + \int_{\mathbb{T} \setminus E_{(1+\epsilon)}} |f_n \circ (\varphi_1 + \varphi_2)|^2 dm \\ &\leq \left( \int_{E_{1+\epsilon}} |f_n \circ (\varphi_1 + \varphi_2)|^4 dm \right)^{1/2} \sqrt{m(E_{(1+\epsilon)})} \\ &\quad + \int_{\mathbb{T} \setminus E_{1+\epsilon}} |f_n \circ (\varphi_1 + \varphi_2)|^2 dm. \end{aligned}$$

Since  $\int_{\mathbb{T} \setminus E_{1+\epsilon}} |f_n \circ (\varphi_1 + \varphi_2)|^2 dm \rightarrow 0$  for each  $(1 + \epsilon)$  as  $n \rightarrow \infty$ , we obtain that

$$\lim_{n \rightarrow \infty} \sup \|f_n \circ (\varphi_1 + \varphi_2)\|_2^2 \leq (1 + \epsilon) \sqrt{m(E_{(1+\epsilon)})}$$

for some constant  $\epsilon \geq 0$  independent of  $(1 + \epsilon) \in \mathbb{N}$ . By letting  $\epsilon \rightarrow \infty$  and using that  $m(E_{(\varphi_1 + \varphi_2)}) = 0$  we deduce that  $\lim_{n \rightarrow \infty} \|f_n \circ (\varphi_1 + \varphi_2)\|_2 = 0$ .

By [18, Prop. 6] there is a subsequence  $(f_{n_{1+\epsilon}} \circ (\varphi_1 + \varphi_2))$  such that

$$\left\| \sum_{\epsilon=0}^{\infty} (1 + \epsilon)_{1+\epsilon} C_{(\varphi_1 + \varphi_2)}(f_{n_{1+\epsilon}}) \right\|_{BMOA} \sim \|1 + \epsilon\|_{\ell^\infty}$$

holds for all  $(1 + \epsilon) = ((1 + \epsilon)_{1+\epsilon}) \in (1 + \epsilon)_0$ . Obviously this contradicts (4.2).

#### 4.2. An Alternative Approach

We next indicate a different approach towards a weaker version of Theorem 1.2 (see [40]), which highlights a connection to the following general interpolation-extrapolation theorem for strictly singular operators on  $L^{1+\epsilon}$ -spaces due to Hernández et al. [14, Thm. 3.8]: Let  $0 < \epsilon \leq \infty$ , and assume that the linear operator  $\mathbb{T}$  is bounded  $L^{1+\epsilon} \rightarrow L^{1+\epsilon}$  and  $L^{1+2\epsilon} \rightarrow L^{1+2\epsilon}$ . Moreover, suppose further that there is  $\epsilon > 0$  for which  $T \in S(L^{1+2\epsilon})$ . Then  $T \in (1 + \epsilon)(L^{1+2\epsilon})$  for all  $\epsilon > 0$ .

To apply the above result suppose that  $C_{(\varphi_1 + \varphi_2)} \in S(H^{1+\epsilon})$ , where  $0 < \epsilon < \infty$ . Recall from Section 3 that the related operator  $f \rightarrow \tilde{C}_{(\varphi_1 + \varphi_2)}(f) = f \circ (\varphi_1 + \varphi_2)$  is bounded on the harmonic Hardy space  $h^{1+\epsilon}$  for  $0 < \epsilon < \infty$ , and that (3.3) holds with respect to  $h^{1+\epsilon} = H^{1+\epsilon} \oplus \overline{H_0^{1+\epsilon}}$  provided  $(\varphi_1 + \varphi_2)(0) = 0$ . It follows from (3.3) that  $\tilde{C}_{(\varphi_1 + \varphi_2)} \in S(h^{1+\epsilon})$ , since  $S(h^{1+\epsilon})$  is a linear subspace. Fix  $(1 + \epsilon)$  and  $(1 + 2\epsilon)$  such that  $0 < \epsilon < \infty$ . Since  $\tilde{C}_{(\varphi_1 + \varphi_2)}$  is bounded  $h^{1+\epsilon} \rightarrow h^{1+\epsilon}$  for any  $0 \leq \epsilon < \infty$  and  $\tilde{C}_{(\varphi_1 + \varphi_2)} \in S(h^{1+\epsilon})$ , the above extrapolation result applied to  $h^{1+\epsilon} = L^{1+\epsilon}(T, m)$  yields that  $\tilde{C}_{(\varphi_1 + \varphi_2)} \in (1 + \epsilon)(h^{1+2\epsilon})$  for any  $\epsilon > 0$ . In particular,  $C_{(\varphi_1 + \varphi_2)} \in (1 + \epsilon)(H^{1+2\epsilon})$  for any  $\epsilon > 0$  by restricting to  $H^{1+2\epsilon} \subset h^{1+2\epsilon}$ . Hence we have deduced by different means the following weak version of Theorem 1.2: if  $C_{(\varphi_1 + \varphi_2)} \in S(H^{1+\epsilon})$ , then  $C_{(\varphi_1 + \varphi_2)} \in (1 + \epsilon)(H^{1+\epsilon})$  for  $0 < \epsilon < \infty$ .

Above we do not address the technical issue that [14] only explicitly deals with real  $L^{1+\epsilon}$ -spaces, whereas the above application requires complex scalars. (We are indebted to Francisco

Hernández for indicating that there is indeed also a complex version.) leave the above alternative here as an incomplete digression, because it is not possible to obtain the full strength of Theorem 1.2 in this way (cf. the following example).

**Example 4.2.** We point out for completeness that the extrapolation result [14, Thm. 3.8] for  $S(L^{1+\epsilon}) = S_{1+\epsilon}(L^{1+\epsilon}) \cap S_2(L^{1+\epsilon})$  does not have an analogue for the classes  $S_{1+\epsilon}(L^{1+\epsilon})$  or  $S_2(L^{1+\epsilon})$ . In fact, let  $((1 + 2\epsilon)_n)$  be the sequence of Rademacher functions on  $[0, 1]$  and  $f \rightarrow Pf = \sum_{n=1}^{\infty} (f, (1 + 2\epsilon)_n)(1 + 2\epsilon)_n$  the canonical projection  $L^{1+\epsilon} \rightarrow M$  for  $0 < \epsilon < \infty$ , where  $M = \overline{\text{span}}\{(1 + 2\epsilon)_n : n \in \mathbb{N}\}$ . Since  $M \approx \ell^2$  by the Khinchine inequalities, see e.g. [23, 2.b.3], it follows that  $P \in S_{1+\epsilon}(L^{1+\epsilon})$  by the total incomparability of  $\ell^{1+\epsilon}$  and  $\ell^2$  for  $\epsilon \neq 1$ . Furthermore, the results of Section 3 (in particular, see Example 3.4 and (3.3)) imply that for  $\epsilon \neq 1$  there are composition operators  $\tilde{C}_{(\varphi_1+\varphi_2)} \in S_2(h^{1+\epsilon})$  which fail to be compact.

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## **Les putschs d'Etats en Afrique**

**Elaboré par : Dr KBIBCHI YOUNESS<sup>152</sup>**

*Professeur de Droit International*

*Coordonnateur de la filière Etudes Politiques et Internationales*

*Faculté de Droit Martil - Tétouan Université ABDELMALEK ESSAADI Maroc*

### **Résumé**

*Ces dernières années, plusieurs pays du Sahel, déstabilisés par l'insurrection djihadiste dans la région, ont connu des putschs ayant conduit à l'instauration de juntes militaires. Sur le plan international, l'Afrique se classe parmi les continents les plus instables depuis la Seconde Guerre mondiale, sept coups d'État sur dix environ ont lieu en Afrique.*

*Les coups d'Etat en Afrique se succèdent depuis 2019. En cinq ans, ce sont six pays du continent qui ont vu leurs leaders renversés, pour certains à plusieurs reprises, tel que le Thad, le Soudan, le Niger, le Gabon, le Burkinafasso, le Guinée et le Mali.*

*Cette intervention vise, à titre non exhaustifs, à Traiter l'évolution des coups d'Etats en Afrique en analysant ses causes et ses conséquences sur l'instabilité politique et sécuritaire à travers une approche à la fois historique et analytique, pour dévoiler ensuite l'influence des acteurs internationaux sur la stabilité interne des Etats de l'Afrique aussi bien que leurs interventions dans la restauration de la paix et la sécurité régionale. Des recommandations liées aux modèles de coopération politique et sécuritaire intra – africaine et autres en rapport avec les conduites des Etats victimes de putschs seraient présentées en conclusion.*

**Mots-clés :** *l'Afrique, coups d'État, la paix et la sécurité régionale, Etats victimes de putschs*

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<sup>152</sup> [younesskbibchi@gmail.com](mailto:younesskbibchi@gmail.com)

## *Evolution historiques des coups d'Etat en Afrique*

*Le continent africain a connu une augmentation significative des coups d'Etat ces dernières années. Il est alors temps de dresser une radiographie des putschs en Afrique (Titre1) pour ensuite traiter leurs évolutions historiques (Titre 2).*

### *Radiographie des coups d'Etat en Afrique*

*Un coup d'État est un renversement du pouvoir par une personne investie d'une autorité, de façon illégale et souvent brutale, de tel acte pourrait être considéré comme une lorsque celle-ci est d'origine populaire. Le putsch est donc un coup d'État réalisé par la force des armes.*

*D'un point de vue historique, et y compris dans l'époque contemporaine, le coup d'État a été l'un des moyens les plus fréquemment utilisés pour accéder au pouvoir. En 1980, plus de la moitié des gouvernements dans le monde étaient issus d'un coup d'État.*

*Une version alternative présente le coup d'État comme un acte d'autorité consistant dans une atteinte réfléchie, illégale et brusque, aux règles d'organisation, de fonctionnement ou de compétence des autorités constituées. Cette atteinte dirigée, selon un plan préconçu et pour des raisons diverses, par une personne ou par un groupe de personnes réunis en un parti ou un corps, pourrait être réalisée dans le but soit de s'emparer du pouvoir, soit d'y défendre ou d'y renforcer sa position, soit d'entraîner une simple modification de l'orientation politique du pays .*

*Dans le monde, sept coups d'Etat sur dix ont lieu en Afrique. Sur les 146 coups d'Etats, 37 ont échoué, soit un taux de réussite de 75 pourcent, c'est le cas du Niger, aussi bien que du Burkina Faso (deux en 2022), de la Guinée (2021) et du Mali (2020 et 2021).*

*Depuis le vaste mouvement de décolonisation, amorcée dès les années 1960, 41 pays de l'Afrique ont connu au moins une tentative sérieuse de renversement du pouvoir. La tentative de coup d'État qui s'est déroulée dernièrement au Gabon le 30 aout 2023 est en effet la 146e du nom depuis 1945 au monde.*



L'Égypte<sup>153</sup> inaugure cette longue série de coup d'État lorsque, dans la nuit du 22 au 23 juillet 1952. Le deuxième coup d'État du continent a lieu au Soudan<sup>154</sup> en 1958. Celui-ci <sup>155</sup>, depuis, détient le record des putschs avec 10 renversements ou tentatives. Il précède deux autres pays particuliers éruptifs à savoir le Burundi qui a connu 8 coups d'État ou tentatives, depuis son indépendance le 1er juillet 1962 à égalité avec le Burkina Faso (ancienne Haute-Volta), indépendant depuis août 1960. Soit environ une moyenne d'un coup d'État ou tentative tous les sept à huit ans.

Parmi les pays les plus instables figurent également le Nigeria avec 7 coups d'État ; le Congo, le Bénin, la République centrafricaine, le Tchad et le Niger<sup>156</sup> avec 6 coups d'État ; les Comores, le Ghana, le Mali et la Guinée-Bissau avec 5 coups d'État ; Enfin, l'Éthiopie et l'Ouganda avec 4 coups d'État. En revanche, deux pays, l'Afrique du Sud (où la transition vers la fin de l'apartheid s'est faite en douceur), aussi bien que le Malawi<sup>157</sup> n'ont pas connu de coup d'État sur le plan africain

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<sup>153</sup> Nasser a renversé la monarchie du roi Farouk I<sup>er</sup>, le 22 juillet 1952.

<sup>154</sup> Le 17 novembre 1958. quand l'armée empêche le Parlement de siéger et porte au pouvoir le général Ibrahim Abboud. La République du Soudan avait obtenu son indépendance le 1<sup>er</sup> janvier 1958. Fait particulier : c'est le Premier ministre, Abdallah Khalil, un général à la retraite, qui a planifié ce coup d'État militaire contre son propre gouvernement de coalition.

<sup>155</sup> Le dernier en date remontant au 25 octobre 2021, lorsque l'armée soudanaise dépose le gouvernement de transition. Le Premier ministre Abdallah Hamdok est arrêté, puis réinstallé dans ses fonctions le 21 novembre, avant de se retirer le 2 janvier 2022.

<sup>156</sup> Le premier putsch a eu lieu le 15 avril 1974, lorsque Seyni Kountché prend le pouvoir par les armes avec le titre de « président du Conseil militaire suprême de la République du Niger ». Il exerce, de facto, la fonction de chef de l'État jusqu'à sa mort en novembre 1987.

<sup>157</sup> La mesure où la Constitution, en 1970, a été modifiée pour confier à Hastings Kamuzu Banda le titre de « président à vie ». Le régime est devenu une dictature, mais

Si l'on découpe les périodes par décades, la palme revient aux seventies, avec 34 coups d'État ou tentatives, sous l'effet de la guerre froide. Les années 1960 et 1980 culminent à 25 putschs ou tentatives. Après la décennie 1980, une décrue est constatée avec 19 coup d'État dans la décennie 1990 et 17 dans les années 2000, et 15 dans les années 2010. Depuis 2020, en seulement trois ans et demi, les coups portés au pouvoir s'élèvent déjà à 10. Tout annonce une nouvelle phase d'instabilité en Afrique.

Les coups d'État en Afrique se caractérisent par trois dynamiques majeures. Premièrement, leur fréquence est très variable, avec des vagues ponctuelles liées à la gouvernance. Deuxièmement, leurs causes, de même que les éléments qui les déclenchent, leurs protagonistes et leurs conséquences éventuelles, varient considérablement d'un pays à l'autre. Il en résulte une diversité de dynamiques transitoires nationales et une multiplicité d'approches en matière de gestion de l'impact des coups d'État.<sup>158</sup> Les mesures<sup>159</sup> prises aux niveaux régional et continental pour y faire face varient considérablement. Enfin, chaque nouvelle recrudescence donne généralement lieu à un durcissement des réponses régionales et continentales, ce qui permet souvent de juguler la tendance jusqu'à ce qu'une nouvelle vague émerge.

Les trois dynamiques<sup>160</sup> évoquées ci-dessus incitent à réfléchir sur l'évolution de la nature et les formes des coups d'État depuis 1952.

### *Chronologie des coups d'Etat en Afrique*

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Banda a dû quitter le pouvoir en 1994 à l'âge vénérable de 98 ans, non sans avoir été battu lors d'élections libres.

<sup>158</sup> Par exemple, la gestion par l'Union africaine du coup d'État de 2014 qui a renversé le président Blaise Compaoré au Burkina Faso diffère sensiblement de la façon dont elle a appréhendé le coup d'État de 2013 en Égypte. De même, la toute récente vague de coups d'État est gérée au cas par cas

<sup>160</sup> [https://www.lemonde.fr/les-decodeurs/article/2023/09/09/les-coups-d-etat-en-afrique-se-succedent-depuis-2019-mali-soudan-niger\\_6188565\\_4355770.html](https://www.lemonde.fr/les-decodeurs/article/2023/09/09/les-coups-d-etat-en-afrique-se-succedent-depuis-2019-mali-soudan-niger_6188565_4355770.html)



Depuis 2020, les pays du continent africain ont été proie à des troubles dus à des coups d'État militaires. Au 30 août 2023, un total de six pays a connu des coups d'État par des juntes militaires et un septième s'est dessiné le long des frontières du Gabon. Ces six pays sont le Mali, la Guinée, le Burkina Faso, le Tchad, le Soudan et le Niger.

Ces coups d'État s'inscrivent dans le contexte d'une lutte d'influence plus large entre l'Occident et la Russie en Afrique, où la montée du "sentiment anti-français" a laissé la porte ouverte au Kremlin. Par ordre chronologique, il est temps de présenter les grandes lignes des sept derniers coups d'État en Afrique.

### *Le cas du Gabon*

Le Gabon<sup>161</sup>, pays avec 2,3 millions d'habitants, a connu un coup d'État le 30 août 2023. Successeur de son père Omar Bongo, mort en 2009, Ali Bongo Ondimba est destitué par un coup d'État militaire<sup>162</sup> et placé en résidence surveillée le jour de la présidentielle qui le donne gagnant avec 64,27 % des suffrages. Cette « révolution de palais » met fin à cinquante-cinq ans de pouvoir dynastique de la famille Bongo, marqués par des irrégularités lors des élections présidentielles.

Le commandant en chef de la garde républicaine gabonaise, Brice Oligui Nguema, cousin éloigné du président déchu, est désigné président de transition.

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<sup>161</sup> « Au Gabon, le chef des putschistes a été arrêté », *Le Monde.fr*, 7 janvier 2019 (lire en ligne [archive], consulté le 16 décembre 2023)

<sup>162</sup> Un groupe d'officiers supérieurs de l'armée gabonaise est apparu à la télévision nationale aux premières heures du mercredi 30 août et a déclaré qu'il avait pris le pouvoir après que l'organisme électoral de l'État a annoncé que le président Ali Bongo, âgé de 64 ans, avait remporté un troisième mandat. Les officiers ont déclaré qu'ils représentaient toutes les forces de sécurité et de défense du pays d'Afrique centrale, ajoutant que les résultats des élections étaient annulés. Ils ont ensuite annoncé que toutes les frontières resteraient fermées jusqu'à nouvel ordre et que les institutions de l'État seraient dissoutes.

Ce dernier s'engagerait à organiser des élections libres, transparentes et crédibles [afin de « rendre le pouvoir aux civils »](#).

*L'absence d'observateurs internationaux, la suspension de certaines émissions étrangères, la désactivation des services Internet et l'imposition d'un couvre-feu nocturne dans tout le pays après le scrutin ont suscité des inquiétudes quant à la transparence du processus électoral.*

### *Le cas du Niger*

*Le Niger<sup>163</sup>, un pays à 25.3 millions d'habitants a connu un coup d'Etat le 26 juillet 2023. Mohamed Bazoum, arrivé au pouvoir légitimement en 2021 dans la continuité de son mentor, Mahamadou Issoufou, semble avoir mis un frein à l'enrichissement du général Abdourahamane Tiani en lui demandant des comptes sur les dépenses de la garde républicaine dont il a la charge, ce dernier avait été nommé par le précédent président, M. Issoufou.*

*Après avoir éloigné de Niamey les militaires les plus loyaux au pouvoir, le général Tiani prend le président en otage le 26 juillet 2023 et décrète la fin du régime, parvenant à rallier à lui le reste de l'armée. Depuis, le chef de la junte militaire a déclaré une période de transition de trois ans à l'issue de laquelle il promet de rendre le pouvoir aux civils. Il demandait aussi aux forces françaises présentes au Niger de quitter le pays.*

*La Communauté économique des États de l'Afrique de l'Ouest (CEDEAO) a annoncé le 10 août son intention de déployer une force régionale pour rétablir l'ordre constitutionnel, tout en continuant de privilégier la voie diplomatique.*

### *Le cas du Burkina Faso*

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<sup>163</sup> « Niger : une tentative de coup d'Etat déjouée deux jours avant l'investiture du nouveau président », *Le Monde.fr*, 31 mars 2021 (lire en ligne [archive], consulté le 27 juillet 2023)



Le Burkina Faso<sup>164</sup>, un pays avec 22.1 millions d'habitants, a connu deux putschs en 8 mois. Le 24 janvier 2022, plusieurs militaires pénètrent dans la résidence du chef de l'Etat et arrêtent le président du Burkina Faso, Roch Marc Christian Kaboré. Au pouvoir depuis 2015 et réélu en 2020 sur la promesse de faire de la lutte antidjihadiste sa priorité, M. Kaboré était de plus en plus contesté par une population excédée par les violences et son impuissance à y faire face. Auteur du putsch, le lieutenant-colonel Paul-Henri Sandaogo Damiba s'empare du pouvoir.

Alors que le président Kaboré avait été renversé en janvier 2022 sous prétexte qu'il ne parvenait pas à contenir l'insurrection djihadiste, la junte dirigée par Paul-Henri Sandaogo Damiba semble aussi dépassée. Huit mois après le précédent putsch, un coup d'Etat est dirigé le 30 septembre 2022 par le capitaine Ibrahim Traoré, menant à l'arrestation puis à la démission du lieutenant-colonel Damiba, qui s'exile au Togo. Officiellement désigné président du Burkina Faso en octobre, Ibrahim Traoré, 34 ans, devient le plus jeune chef d'Etat au monde, un poste qu'il n'est censé occuper que jusqu'aux élections prévues en juillet 2024. A son arrivée au pouvoir, le leader de la junte rompt toute coopération avec la France, préférant se tourner vers la Turquie et la Russie.

### *Le cas du Soudan*

Le Soudan<sup>165</sup>, un pays à 45.7 millions d'habitants, a connu deux coups d'Etat respectivement le 11 avril 2019 et le 25 octobre 2021. Après trente ans de pouvoir dictatorial, le président Omar Al-Bachir (qui avait lui-même

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<sup>164</sup> « Au Burkina Faso, le lieutenant-colonel Damiba renversé par un nouveau coup d'Etat », *Le Monde.fr*, 1<sup>er</sup> octobre 2022 (lire en ligne [archive], consulté le 16 mai 2023) ; Coia aussi « Guinée-Bissau : le président Embaló dénonce «une tentative de coup d'État» [archive] », sur *Le Figaro*, 2 décembre 2023 (consulté le 16 décembre 2023)

<sup>165</sup> « Au Soudan, l'armée provoque la chute d'Omar El Béchir », *La Croix*, 11 avril 2019 (ISSN [0242-6056](https://doi.org/10.1016/S0242-6056), lire en ligne [archive], consulté le 16 décembre 2023)

accédé à la tête du pays par un coup d'Etat militaire en 1989) est renversé par l'armée soudanaise, alors que le pays est en proie à des manifestations consécutives au triplement du prix du pain. Le lendemain du putsch, le général Abdel Fattah Abdelrahman Al-Bourhane prend le contrôle de la junte. En août 2019, le haut-fonctionnaire Abdallah Hamdok était nommé premier ministre d'un gouvernement de transition censé amener civils et militaires à gouverner ensemble et réformer le pays afin d'organiser des élections générales en juillet 2023. Celles-ci n'ont jamais eu lieu.

Deux ans et demi après la chute du dictateur Omar Al-Bachir, et un mois après une première tentative de putsch déjouée, le général Abdel Fattah Abdelrahman Al-Bourhane fait arrêter le premier ministre, Abdallah Hamdok. Le militaire, qui dirigeait le conseil de souveraineté depuis 2019, déclare l'état d'urgence, coupe l'accès à Internet et prononce la dissolution des instances de transition. Depuis, les oppositions ont été violemment réprimées, les promesses d'organiser des élections en juillet 2023 ont été oubliées et le pays s'enlise dans la crise. Le 15 avril 2023, le général Al-Bourhane [entre en guerre contre les paramilitaires des Forces de Soutien Rapide \(FSR\)](#), dirigées par le général Mohammed Hamdan Daglo, son ancien allié lors du putsch de 2021. La guerre a fait des milliers de morts estimés au moins à cinq mille et 3,6 millions de déplacés dans le pays.

### *Le cas de la Guinée*

La Guinée<sup>166</sup>, un pays à 13.5 millions d'habitants, a connu un coup d'Etat le 5 septembre 2021. Le Premier président guinéen librement élu en 2010, Alpha Condé paie son envie de s'accrocher au pouvoir. En 2020, le dirigeant de 83 ans fait modifier la Constitution de son pays, afin de se faire réélire pour un troisième mandat, malgré une vague de protestation, durement réprimée. L'année

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<sup>166</sup> « Guinée-Bissau : confusion après l'arrestation du premier ministre par des militaires », *Le Monde.fr*, 1<sup>er</sup> avril 2010 (lire en ligne [archive], consulté le 16 décembre 2023) ; Voir aussi « Guinée-Bissau : le président Embaló dénonce «une tentative de coup d'État» [archive] », sur *Le Figaro*, 2 décembre 2023 (consulté le 16 décembre 2023)



suivante, le 5 septembre 2021, il est arrêté par le commandant des forces spéciales guinéennes, Mamadi Doumbouya. Le président refuse de démissionner mais le colonel se fait investir comme président pour une période de transition à durée indéterminée. Si la junte s'engage à céder la place à des civils élus après une période où elle aura mené de profondes réformes, elle a interdit toute manifestation depuis 2022 et les grands partis du pays refusent le dialogue avec le pouvoir militaire. Mamadi Doumbouya a réaffirmé en février 2023 son ambition de [quitter le pouvoir à l'issue de la transition, fin 2024](#).

### *Le cas du Mali*

Le Mali<sup>167</sup>, un pays à 21.9 millions d'habitants a connu deux coups d'Etat en neuf moi, le 18 août 2020 aussi bien que le 24 mai 2021. Elu en 2013, le président malien Ibrahim Boubacar Keïta, dit « IBK », est arrêté avec son premier ministre, Boubou Cissé, par des militaires, le 18 août 2020. Détenu par les putschistes, il annonce aussitôt sa démission dans une allocution télévisée. Depuis plusieurs mois, l'opposition, qui tenait hebdomadairement des manifestations à Bamako, réclamait son départ, alors que les groupes djihadistes multipliaient les attaques mortelles contre les militaires. La junte au pouvoir annonce la création d'un comité militaire dirigé par le colonel Assimi Goïta. Un président de transition, Bah N'Daw, est nommé en septembre 2020, mais les soldats gardent une main sur le pouvoir. M. Goïta est ainsi nommé vice-président de la transition.

Neuf mois à peine après le coup d'Etat qui a renversé IBK, le colonel et vice-président de transition Assimi Goïta mène un deuxième putsch. Le 24 mai, après un remaniement ministériel, mettant sur la touche deux ministres qui avaient participé au coup d'Etat à ses côtés, M. Goïta fait arrêter le président de

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<sup>167</sup> « [Mali : pourquoi Bah N'Daw et Moctar Ouane sont toujours retenus à Kati – Jeune Afrique](#) [archive] », sur [JeuneAfrique.com](http://JeuneAfrique.com), 24 mai 2021 (consulté le 16 mai 2023)

transition<sup>168</sup> Bah N'Daw et son premier ministre Moctar Ouane puis les pousse à démissionner. Quatre jours plus tard, le colonel Goïta est proclamé président de transition du Mali. En janvier 2023, le président déchu, IBK, meurt d'une crise cardiaque.

La prise de pouvoir des militaires à Bamako détériore fortement les relations du pays avec la France, ancienne puissance coloniale engagée militairement au côté de l'armée malienne contre les djihadistes depuis 2013. La junte pousse les forces françaises vers la sortie en 2022 et se tourne politiquement et militairement vers la Russie.

### Le cas du Tchad

Le Tchad<sup>169</sup>, un pays à 17.2 millions d'habitants, a connu un coup d'Etat le 20 avril 2021. Militaire de carrière et combattant rebelle, Idriss Déby s'était emparé du pouvoir au Tchad après un coup d'Etat en 1990. Le 20 avril 2021, au lendemain de [sa réélection pour un sixième mandat](#), l'armée annonce la mort au combat de celui qui dirigeait le pays sans partage depuis trente ans. S'il ne s'agit pas d'un coup d'Etat au sens strict, l'un de ses fils, le général Mahamat Idriss Déby Itno, s'empare aussitôt du pouvoir et dissout le gouvernement et l'Assemblée nationale. [En octobre 2022](#), le général de 38 ans est investi président de transition du Tchad pour deux ans de plus, tout en s'accordant le droit de concourir à la prochaine élection, au moment où il aurait dû rendre le pouvoir et organiser des élections comme il s'y était engagé en avril 2021. Mahamat Idriss Déby n'en reste pas moins, comme son père, un allié stratégique pour la France et sa présence militaire au Sahel.

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<sup>168</sup> En juin 2023, un projet de nouvelle Constitution est approuvé à la quasi-unanimité par les électeurs maliens, mais avec une faible participation et sur fond d'irrégularités. Ses détracteurs décrivent ce texte comme taillé sur mesure pour permettre aux colonels de se maintenir au pouvoir au-delà de la présidentielle prévue en février 2024, malgré leur engagement initial à rétrocéder la place aux civils après les élections.

<sup>169</sup> « Tchad: 'Un coup d'État institutionnel' dénoncé par les principaux partis d'opposition | TV5MONDE - Informations [archive] », sur [information.tv5monde.com](http://information.tv5monde.com), 21 avril 2021 (consulté le 31 août 2023)



## *Les facteurs déclencheurs des coups d'Etat en Afrique*

*L'Afrique a connu de multiples putschs avec des facteurs déclencheurs variés. De multiples causes politiques seront présentées (Titre1) pour ensuite traiter les autres à caractères socio-économiques (Titres 2).*

### *Les causes politiques et institutionnelles*

*Le renversement du roi Farouk en 1952 par l'armée égyptienne se considère comme la première intervention militaire pour accéder au pouvoir en Afrique. Depuis lors, les ingérences militaires dans les affaires politiques sont devenues monnaie courante pour conquérir le pouvoir, avec quelque 100 coups d'État réussis dans 35 pays africains.*

*Entre 1960 et 1970, le contexte politique qui a prévalu après les indépendances a donné lieu à la première vague de coups d'État. Plusieurs leaders des mouvements de libération postindépendance ont été renversés, leurs orientations politiques et idéologiques étant incompatibles avec les intérêts des principales puissances coloniales. Cette situation a été aggravée par l'incapacité des dirigeants à répondre aux aspirations des populations en matière d'économie et de développement. Compte tenu des vives rivalités entre les superpuissances pendant la guerre froide et de l'émergence de régimes à parti unique et de dictatures, il est à affirmer que certains officiers supérieurs ont été influencés par un ensemble de facteurs.*

*Ces coups d'État se sont généralement accompagnés de massacres. Ainsi, pas moins de 12 dirigeants africains ont été tués, des exécutions extrajudiciaires ont été perpétrées et les droits humains ont été très largement violés, en particulier en Afrique de l'Ouest. Certains coups d'État ont été applaudis pour avoir mis fin à des régimes à parti unique et à des présidences à vie. Cette première vague a finalement abouti à la première réorganisation du paysage politique de l'Afrique post-indépendance.*

*Au cours des années 1980, les dirigeants africains, principalement militaires, ont échoué à honorer leurs promesses, à instaurer la démocratie et à satisfaire*

les aspirations socio-économiques de leurs populations. C'est ainsi qu'une nouvelle vague de coups d'État a déferlé sur l'Afrique entre 1990 et 2001. Ils ont été menés cependant en grande partie par des officiers militaires de rang intermédiaire, aux motivations proches de celles de la première vague, au prétexte qu'il fallait remédier à la mauvaise gestion économique de leur pays.

Au cours de cette vague, 14 % seulement des dirigeants ont été tués et il y a eu sensiblement moins de violations des droits humains. Néanmoins, elle a constitué une menace considérable pour de nombreux dirigeants africains et a mis en péril la démocratie qui s'implantait sur le continent.

En conséquence, les normes régionales et continentales ont été renforcées à la fin de la décennie et ont abouti à l'adoption de la décision d'Alger170 sur les changements anticonstitutionnels<sup>171</sup> de gouvernement puis, en 2000, à l'adoption de la déclaration de Lomé<sup>172</sup>. La décision d'Alger interdit aux auteurs de coups d'État d'assister aux sommets de l'Organisation de l'unité africaine, tandis que la déclaration de Lomé établit une politique de tolérance zéro à l'égard des coups d'État. Ces deux mesures, associées à l'expansion de la

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chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.peaceau.org/uploads/ahg-decl-5-xxxvi-f.pdf

171 Les changements inconstitutionnels de gouvernement sont définis comme suit : les coups d'État militaires contre un gouvernement démocratiquement élu ; les interventions de mercenaires pour remplacer un gouvernement démocratiquement élu ; les remplacements de gouvernements démocratiquement élus par des groupes armés dissidents et des mouvements rebelles ; et le refus d'un gouvernement sortant d'abandonner le pouvoir suite à une défaite lors d'élections libres, justes et régulières. <https://issaffrica.org/fr/iss-today/coups-detat-causes-ou-symptomes-de-la-mauvaise-gouvernance>

172 <https://diplomatie.gouv.tg/declaration-de-la-premiere-edition-de-lome-peace-and-security-forum/>



démocratie, ont permis de réduire considérablement le nombre de coups d'État et de mettre un terme à cette deuxième vague

Depuis 2021, l'Afrique connaît une troisième vague de coups d'État (au Soudan, au Mali, en Guinée, au Burkina Faso, au Niger et au Gabon) dont les caractéristiques diffèrent dans l'ensemble de celles des décennies précédentes. Tout d'abord, les motivations de leurs auteurs ont changé. Certains sont préoccupés par les reculs démocratiques liés à la manipulation des constitutions en vue de prolonger les mandats, par les résultats électoraux frauduleux, par la détérioration de la sécurité et par la montée d'un sentiment anticolonialiste.

La complexité de ces problèmes et leur manifestation varient d'un pays<sup>173</sup> à l'autre. Si certains coups d'État, notamment en Guinée et au Gabon, ont été présentés comme des tentatives de rétablissement de la démocratie, les moteurs et les résultats réels sont à la fois plus complexes et plus variés.

Les récents coups d'État en Guinée, au Niger et au Gabon ont tous été dirigés par des membres de la garde présidentielle, c'est-à-dire par des unités d'élite de l'armée. Il s'agit là de la deuxième caractéristique des coups d'État modernes. Ils se sont en effet produits dans des pays africains francophones où la protection du président est souvent assurée par une garde présidentielle qui constitue une composante à part entière de l'armée. Les gardes présidentiels sont souvent mieux armés et mieux entraînés que les autres soldats.

Il leur est plus facile de profiter de leur proximité avec la présidence pour prendre le pouvoir et faire ensuite pression pour que l'armée intervienne. Cette situation témoigne de tensions dangereuses et latentes qui trouvent leur origine dans la politisation de l'armée, imputée aux élites politiques, et le népotisme qui y sévit.

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<sup>173</sup> Les auteurs du coup d'État au Niger, par exemple, affirment qu'ils ont été motivés par la détérioration continue de la situation sécuritaire et la mauvaise gestion sociale et économique du pays. En Guinée, la junte a reproché à Alpha Condé la mauvaise gestion, la corruption et la mauvaise gouvernance .

Contrairement aux vagues précédentes, caractérisées par des bains de sang et des violations flagrantes des droits humains, les récents coups d'État ont été intelligents. Il n'y a eu aucune effusion de sang et peu d'atteintes aux droits humains. La tendance à la baisse du nombre de décès des dirigeants déchus, observée dans les années 1990, s'est poursuivie.

Les coups d'État postérieurs aux années 1990 n'ont donné lieu à l'exécution d'aucun dirigeant, montrant qu'ils ont été réalisés dans un esprit de modération. Les dirigeants destitués ont souvent été détenus par la junte pendant des périodes variables avant d'être libérés, sous l'œil attentif de la communauté internationale et à la demande de celle-ci.

Alors que, par le passé, la dimension internationale des coups d'État était principalement axée sur les jeux d'influence des puissances extérieures, la plus récente vague de coups d'État se distingue par un sentiment anti-impérialiste des populations, principalement à l'encontre de la France<sup>174</sup>. En revanche, le recours à des éléments militaires étrangers tels que le groupe Wagner pour sécuriser les territoires a augmenté, notamment au Mali et au Burkina Faso. Des réactions et des attentes similaires ont été exprimées au Niger.

Les putschistes<sup>175</sup> ont également résisté à la mise en œuvre des normes régionales et continentales contre les changements anticonstitutionnels de gouvernement (CAG). Concernant la situation au Niger, le Burkina Faso, la Guinée et le Mali se sont engagés à soutenir la junte et ont menacé de prendre des mesures de rétorsion si la CEDEAO proposait une intervention militaire.

Si ces dynamiques sont spécifiques aux coups d'État contemporains, les déficits de gouvernance et l'incapacité des élites politiques à répondre aux attentes des

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<sup>174</sup> Il s'est traduit par l'expulsion des troupes françaises basées au Mali.

<sup>175</sup> Au Niger, ils ont refusé toute interaction avec la Communauté économique des États de l'Afrique de l'Ouest (CEDEAO). Il convient également de mentionner l'alliance « passée entre le Gabon, le Niger et le Burkina Faso, fondée sur une solidarité et une loyauté réciproques.



*citoyens en constituant également les principaux moteurs. Ce qui met en évidence les similitudes entre les coups d'État passés et actuels. Même si les coups d'État ont évolué, les impératifs liés à la gouvernance sont toujours au cœur des préoccupations. Ainsi, bien que la troisième vague de coups d'État soit d'un type différent, il s'agit en fait d'une seule et même menace aux nuances différentes.*

*Compte tenu de l'évolution des dynamiques des coups d'État en Afrique et des caractéristiques des récentes occurrences, le Conseil de paix et de sécurité (CPS) devrait préconiser un réexamen<sup>176</sup> complet des cadres existants pour contrer les CAG. Un tel travail est essentiel pour adapter les réponses à l'évolution des dynamiques des coups d'État contemporains.*

*Toutefois, pour faire face à cet enjeu, il est nécessaire d'adopter une approche multidimensionnelle qui s'attaque efficacement aux défis immédiats posés par les coups d'État et aux problèmes de gouvernance sous-jacents qui les favorisent. Les incohérences du CPS et son application sélective des normes continentales dans la gestion des coups d'État doivent être abordées, car elles sont susceptibles de miner l'autorité morale nécessaire pour y faire face.*

*La mise en place du comité des sanctions du CPS devrait être une priorité, afin de démontrer de façon concrète la volonté politique de lutter contre les coups d'État sur le continent. Elle renforcera également les efforts de l'Union africaine pour surveiller les pays qui font l'objet d'une suspension.*

### *Les facteurs socio - économiques*

*L'Afrique subit des vagues de déstabilisation politique et sociale dues aux effets de la mondialisation. Déjà fragiles, les jeunes Etats connaissent une forte domination des multinationales et la dislocation des sociétés sous l'effet des politiques d'ajustement structurels, ce qui affaiblit la puissance publique et rendrait par conséquent le coup d'Etat comme un mode naturel de conquête du pouvoir.*

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<sup>176</sup> La Déclaration de Lomé et la Charte africaine de la démocratie, des élections et de la gouvernance pourraient être les premiers instruments à faire l'objet d'une telle révision

*Les crises actuelles apparaissent d'une tout autre nature que celles qui affectaient les Etats africains dans les années qui ont suivi les indépendances. Aux luttes idéologiques de la guerre froide ont succédé une double déstabilisation en raison de l'insertion à marche forcée dans la mondialisation économique, d'une part, et, d'autre part, de la démocratisation improvisée d'Etats sans moyens. Ces deux phénomènes ont abouti à délégitimer les constructions nationales naissantes et à rendre purement fictive la souveraineté de ces pays.*

*Plusieurs phénomènes de nature très différente ont conjugué leurs effets déstabilisateurs tel que la fin de l'affrontement Est-Ouest, qui structurait la géopolitique africaine ; l'improvisation par les bailleurs de fonds d'une injonction démocratique mal maîtrisée ; le nouveau cadre macroéconomique ultralibéral avec des privatisations sauvages, programmes d'ajustement structurel incohérents et drastiques, plans sociaux déguisés, exploitation abusive de la main-d'œuvre, prix dérisoires des matières premières et fraudes, mesures commerciales désavantageuses, etc. ; les interventions féroces des multinationales occidentales et de puissantes banques orientales ; l'explosion de la dette ; la corruption des petits et des grands fonctionnaires ; le trafic d'armes ; etc. Autant de maux qui ont fini par faire s'effondrer un continent déjà bien fragilisé.*

*Sur le plan développement, tous les indicateurs macroéconomiques, sociaux et sanitaires se sont dégradés depuis les années 1980, éradiquant les classes moyennes et suscitant de profondes tensions sociales. L'Afrique de l'Ouest s'est appauvrie<sup>177</sup> ; tous les produits intérieurs bruts<sup>178</sup> se sont détériorés.*

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<sup>177</sup> Le Programme des Nations unies pour le développement (PNUD) fait état d'une dégradation sans précédent des indicateurs de développement humain.

<sup>178</sup> La croissance est même passée de 3,5% en moyenne en 1975 à 2% en 2000.



Le chômage<sup>179</sup> ne cesse de croître. Les pathologies (sida, maladies tropicales, etc.) se propagent et affectent gravement l'espérance de vie des populations. Les réfugiés se dénombrent par milliers. Paupérisées, les armées<sup>180</sup> sont devenues une menace constante pour les régimes de nombreux pays,

L'existence et le fonctionnement de chaque Etat d'Afrique de l'Ouest sont directement dépendants des calculs<sup>181</sup> des Etats voisins, surtout en rapport avec l'immigration massive de travailleurs, ingérences politiques. Le droit public interne – la Constitution – est désormais déterminé par le droit public international, c'est-à-dire par la qualité de la relation avec les autres Etats. Or, si celle-ci peut contribuer à un règlement de paix positif<sup>182</sup>, elle est parfois jugée négative et portée par l'hostilité<sup>183</sup>.

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<sup>179</sup> Presque partout les salaires de la fonction publique sont versés avec difficulté. En Centrafrique, au printemps 2003, l'une des premières mesures du gouvernement putschiste du général François Bozizé était d'annoncer le paiement des traitements en retard.

<sup>180</sup> Comme le montrent le putsch en Centrafrique, la tentative de coup d'Etat au Burkina Faso et la rébellion de Côte d'Ivoire

<sup>181</sup> Répercussion régionale de l'instabilité de la Côte d'Ivoire, notamment pour les pays enclavés (Mali, Burkina...).

<sup>182</sup> Par exemple au Congo-Kinshasa, où les Nations unies et l'Afrique du Sud ont parrainé des accords.

<sup>183</sup> La crise ivoirienne en est une illustration significative. En effet, la Constitution nationale (présidentielle) est contredite par les accords de Linas-Marcoussis du 24 janvier 2003 (qui organisent un partage du pouvoir avec les factions rebelles, au détriment de la présidence et au profit du gouvernement). Ces accords, aussi légitimes et nécessaires soient-ils, marquent le point culminant du processus historique d'affaiblissement de l'institution présidentielle depuis 1990, et la fin du régime de Félix Houphouët-Boigny. Or, en Côte d'Ivoire, l'institution présidentielle ne peut être remplacée par une primature aux pleins pouvoirs, le pays n'ayant pas encore un régime parlementaire comme en a, par exemple, le Cap-Vert. Pour les Ivoiriens, un droit public

*La forte interdépendance des Etats africains dépend elle-même, et pour beaucoup, des intérêts des multinationales. Ces dernières, qu'elles soient européennes ou orientales, ont soumis et dompté les appareils d'Etat. Elles ont de facto aboli les frontières héritées de la colonisation et ont profondément modifié la nature des Etats du continent, en en faisant des annexes ou des bureaux de contrôle.*

*Les conflits ethniques<sup>184</sup> ne sont souvent que le paravent des calculs d'intérêt effectués par les pouvoirs en place ou des multinationales. Ces derniers instrumentent des conflits régionaux ou locaux pour obtenir ou conserver des marchés et des concessions.*

*Cette immixtion des multinationales<sup>185</sup> — comme des règles de la mondialisation économique — dans la sphère publique africaine a provoqué un amalgame entre droit public et droit privé. En effet, la chose publique n'est pas gérée conformément aux règles universelles de l'administration publique, mais selon les règles juridiques du droit privé. La plupart des chefs d'Etat africains ne se pensent pas comme des présidents de la République, garants de l'intérêt général, mais agissent plutôt comme des présidents de conseil d'administration.*

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*externe excellent vaut moins qu'un droit public interne défectueux. Evidemment, ces contradictions expliquent sans les justifier les changements de position du président Laurent Gbagbo.*

<sup>184</sup> *Le rôle des industriels du bois dans la décomposition du Liberia et du Congo-Kinshasa a ainsi été dénoncé par des organisations non gouvernementales et un rapport des Nations unies. La presse ivoirienne ne manque jamais une occasion de rappeler que la crise du pays est née lorsque le président Gbagbo a annoncé la renégociation de certains marchés publics.*

<sup>185</sup> *La gestion du pétrole, de l'or ou du diamant, la vente des produits agricoles et des ressources naturelles (minerais, bois) donnent lieu à des comportements claniques, voire d'allégeance féodale, de la signature des contrats d'exploitation des matières premières (commissions) jusqu'à la répartition des fortes valeurs ajoutées dégagées lors des ventes sur le marché mondial.*



Les peuples sont évidemment les grands perdants de ce partage du pouvoir au sommet. Dans un tel contexte, le coup d'Etat devient un mode normal de dévolution de la puissance publique.

Depuis la fin de l'affrontement Est-Ouest, les multinationales<sup>186</sup> agissent de plus en plus sans contrepoids politiques. Liées, à l'origine, aux intérêts gouvernementaux, elles acquièrent une certaine autonomie. En Afrique<sup>187</sup>, où les Etats sont faibles, elles ont littéralement fait de la politique étrangère en mettant à profit le désengagement rapide – dicté par le refus d'ingérence dans les affaires intérieures – des pays européens. Sur ce continent, jamais il n'y a eu autant de batailles, de pathologies, de pillage de l'économie et du sous-sol. Les profits accumulés ces quinze dernières années sont considérables, voire inégalés. La réduction de l'aide publique au développement livre les Etats à l'appétit des grandes firmes. De sorte que, dans bien des cas de déstabilisation des régimes, les Etats européens se trouvent en complet décalage, par rapport à l'évolution des événements. Et c'est donc toujours après coup qu'ils tentent de reprendre la main, notamment par l'exercice d'une méthode éprouvée : la mise en place des réconciliations nationales.

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<sup>186</sup> Au Forum social africain d'Addis- Abeba en février 2003, un délégué du Congo-Brazzaville a pu estimer ironiquement que deux légitimités s'affrontaient dans son pays : la légitimité démocratique et la légitimité pétrolière. La notion de recolonisation civile par le monde économique international sied à cette situation. Et elle souligne clairement l'impuissance de l'autorité publique en Afrique.

<sup>187</sup> Le procès des dirigeants de la société Elf a révélé les négociations organisées par M. Loïk Le Floch-Prigent avec la rébellion angolaise (Union pour l'indépendance totale de l'Angola — Unita) de Jonas Savimbi, tandis qu'il finançait officiellement le pouvoir en place (Mouvement populaire de libération de l'Angola — MPLA).

## Conclusion

*L'occurrence de coups d'État en Afrique au cours des sept dernières décennies est directement liée à la nature et à l'évolution de la politique et des réactions citoyennes. Elle s'explique par la primauté de la politique dans l'émergence et la perpétuation des facteurs à l'origine des revendications des populations. De même l'opposition aux gouvernements discrédités en place et "l'envoi d'un message à la France et à ses alliés occidentaux", ont été les principaux facteurs avancés par les juntes militaires pour justifier ces coups d'État. Ainsi, les trois principales vagues de coups d'État qui ont touché le continent depuis les indépendances diffèrent par leurs motivations, leurs conséquences et le profil de leurs protagonistes.*

*L'Afrique subit avec une acuité particulière les déstabilisations politiques et sociales dues à la mondialisation. Les Etats africains se trouvent de plus en plus fragilisés – par le Fonds monétaire international (FMI), la Banque mondiale, d'un côté, et par les multinationales, de l'autre. La déstabilisation des Etats africains s'inscrit ainsi dans la logique d'un ordre mondial inégalitaire, qui discrédite par lui-même la chose publique. En effet, déjà fragiles, les jeunes Etats indépendants n'ont que la domination des multinationales et la dislocation des sociétés sous l'effet des politiques d'ajustement structurel. Ainsi, la puissance publique perdrait sensiblement sa force et le coup d'Etat deviendrait un mode naturel de conquête du pouvoir.*

*Pour la première fois sans doute apparaît, à travers les crises politiques actuelles, le besoin réel de bâtir une nouvelle unité politique et économique de l'Afrique. Celle-ci devrait dépasser les structures traditionnelles comme l'Union africaine aussi bien que les formes anciennes d'union économique telles la Communauté économique des Etats d'Afrique de l'Ouest (Cedeao) et l'Union économique et monétaire ouest-africaine (Uemoa), ou encore le Nouveau partenariat économique pour le développement de l'Afrique (Nepad).*



*C'est l'éventualité d'une unité réelle du continent qui pourrait s'amorcer à partir de la défaite historique des Etats africains. Et, dans ce désastre continu depuis cinq siècles, les Africains n'ont pas la plus petite part de responsabilité.*

*Il faudrait donc rechercher les voies et moyens par lesquels les multinationales impliquées dans des tentatives de déstabilisation pourraient être traduites devant la Cour pénale internationale (CPI). Pour ce faire, il conviendrait de mettre en place un corps judiciaire international composé de juges africains rompus aux mécanismes financiers et économiques, et spécialisés dans la traçabilité des mouvements de capitaux finançant les coups d'Etat et les rébellions. Il faudrait aussi accroître les contrôles sur la dévolution des marchés publics africains.*

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An opinion piece titled:  
**“The Role of Artificial Intelligence Applications in Teaching Computer Science Courses”**

**a. Jaber Hamood Hamdoon AL-Naumani**

*Ph.D. Researcher at University of Tunis Higher Institute of management*

**b. Professor Supervisor: Latifa Ben Arfa Rabai**

*Professor at the Higher Institute of Management at the University of Tunis*

**Abstract:**

With the growing use of digital technology in educational institutions, **artificial intelligence (AI) technologies** have become an important field of research, especially in the educational domain. This is particularly true for higher education institutions. These AI technologies have reshaped the communication landscape within educational institutions by supporting enhanced learning through the delivery of various study materials to students across educational platforms powered by AI tools.

The goal is to achieve educational objectives. Simulated robots, supported by these tools, play a crucial role in providing diverse educational services to students, meeting their needs by disseminating educational content related to computer science through text, audio, and visual formats. Artificial intelligence refers to the ability of systems and machines to simulate human intelligence in performing various tasks within the educational environment. It can enhance teaching and learning experiences based on information and data provided through digital platforms supported by these technologies. Consequently, it contributes to developing remote learning skills among students and creates an interactive educational environment that fosters dialogue and participation between digital content-disseminating robots and students. Therefore, in our discussion, we will shed light on the **use of artificial intelligence applications in teaching computer science courses**.

**Keywords:** Artificial intelligence technologies, teaching, computer science courses.

## **Introduction:**

*Technological advancements and augmented reality techniques have opened new horizons in the field of education. With the widespread use of artificial intelligence (AI) technologies in higher education institutions, research on online educational platforms supported by these technologies has become an integral part of the university learning environment. AI applications connected to devices and educational software are among the most impactful technological innovations for students within the educational setting. These applications excel at inferring knowledge and skills required within specific time frames. Additionally, they automatically update lessons for students, delivering content tailored to their needs and abilities. Furthermore, they enable remote learning for students worldwide, provide virtual guides for student support, offer diverse options, and address frequently asked questions. This allows students to explore relevant material at their convenience without waiting for a teacher's availability (Iman Mohammed, 2022, p. 419). Artificial intelligence aims to equip machines with the ability to simulate logical thinking, making it a field of intelligent machine engineering (Abeer Asaad, 2017, p. 12).*

*AI-dependent approaches have contributed to diverse teaching methods by producing various educational content and delivering it to students through digital platforms supported by AI technologies, including text, audio, and visual formats. This is particularly relevant for computer science courses. Simulated robots, which disseminate educational lectures, play a crucial role due to their capacity to store vast amounts of information. Consequently, students benefit from quick assistance, such as utilizing AI chatbots and virtual instructors via digital video technologies. These advancements significantly enhance remote learning, motivate students to master various skills, and foster cognitive development. Moreover, students excel in visual intelligence, creating an educational environment that thrives on interactive learning through dialogue and participation between simulation robots and students.*



## **Theoretical Framework**

*Artificial Intelligence and Teaching Educational Courses in the University Environment: Artificial intelligence (AI) is the machine's ability to simulate human intelligence through computer programs designed to execute tasks that typically require intelligence. It focuses on developing machines and adding this capability to them (Akgun, S., Greenhow, C, 2022, p. 431).*

*Educational platforms supported by AI applications are among the most impactful digital tools for assisting students in searching for educational content that piques their interest. These platforms are powered by AI-driven simulation robots that deliver educational courses through interactive digital platforms. This contributes to enhancing students' learning skills across various fields.*

***The AI environment within education consists of three components (Heba Sabhi, 2023, p. 22):***

- 1. Knowledge Base:*** This includes a set of logical and mathematical rules and assumptions that illustrate how facts relate logically. It encompasses absolute facts describing logical relationships between elements and concepts. Additionally, it includes experiential and practice-based facts, problem-solving methods, and consultation rules. Knowledge representation in expert systems can be achieved through various methods, such as rule-based systems, object-based knowledge systems, frame-based knowledge systems, and case-based knowledge systems.
- 2. Inference Mechanism:*** This refers to programmed procedures that lead to the desired solution by linking specific rules and facts to form a deduction and inference chain. These resources facilitate user interaction with the expert system by inputting information and instructions.
- 3. Learning Capability:*** The ability to learn is a crucial feature of artificial intelligence, relying on machine learning strategies. By analyzing data, excluding irrelevant information, classifying relevant information, making predictions, and storing this knowledge for future use, AI systems enhance

remote learning significantly. This process also stimulates students to master various skills, particularly visual intelligence. Consequently, it creates an educational environment based on interactive learning through dialogue and participation between simulation robots and students.

4. **User Interface:** This component provides users with suitable tools for interacting with the system.
  - A. **Duolingo:** Duolingo is an application dedicated to language learning and enhancing linguistic skills for students. It offers individual lessons, vocabulary exercises, and interactive tests to support language learners in their proficiency journey. Artificial intelligence plays a role in recognizing speech, pronunciation feedback, and creating engaging materials (Khairiya Al-Qahtani, 2023).
  - B. **Otter Voice Notes:** This application converts lectures and voice conversations between individuals into text files, allowing for easy sharing with others (Ira Katznelson and Mark Kesselman, 2014, pp. 13-14).
  - C. **Expert Systems and Distance Learning:** Expert systems contribute to advancing the learning process, problem-solving, decision-making, project evaluation, and research in distance education (Malika Mazkur, 2021, p. 140).
  - D. **Social Media Networks:** AI-powered platforms for automated learning, such as Facebook, Twitter, and YouTube, enhance user interaction. These platforms excel in deep learning, analyzing words, images, and texts to understand context and meaning in user posts (Zhao, L., Chen, L., Liu, Q., Zhang, M., Copland, H, 2019, pp. 45-51). They utilize their proprietary algorithms to analyze user-generated content.

The use of artificial intelligence applications as educational tools for teaching computer science courses becomes evident in the following areas:

1. **Computer Software.**



2. **Software Engineering.**
3. **Database Systems.**
4. **Viruses.**
5. **Fundamentals of Networking and the Internet.**
6. **Internet Browsing and Data Protection.**
7. **Microsoft Excel.**

### **Importance of Using Artificial Intelligence Applications in Education**

Artificial intelligence (AI) technologies rely on machine learning, where machines learn from data and improve their performance without explicit programming. Additionally, natural language processing enables machines to understand, interpret, and generate human language. The significance of leveraging AI applications in educational institutions (Ismail Yassin, 2023) includes:

1. **Personalized Learning and Improved Student Outcomes:** Personalized AI-driven learning adapts the learning experience to individual student needs and preferences. Using machine learning algorithms to assess student performance and provide feedback enhances accuracy and objectivity.
2. **Educational Chatbots:** Educational chatbots support and guide students by processing natural language to understand their queries and provide relevant information. This facilitates students' access to resources and assistance.
3. **Data Analysis and Insights:** AI-driven analysis of student data offers insights into their academic progress and performance. It helps identify areas where students need additional support and allows for strategic teaching adjustments.
4. **Customized Curricula:** AI-based curricula create tailored learning paths based on individual student needs and preferences. This approach makes learning more engaging and effective.

## **Interaction with Educational Content on AI-Supported Digital Platforms.**

*This refers to the various forms and patterns through which the audience interacts with public page posts on the internet. It constitutes part of the dialogue between media institutions and their audience, allowing both parties to make informed decisions and contribute to social capital creation (Wala Ibrahim, 2023, pp. 612-613).*

*Certainly! Here are the various forms of interaction with educational content on AI-supported digital platforms:*

- 1. **Liked Interaction:** Refers to expressing approval for content on digital platforms.*
- 2. **Comment Interaction:** Involves dialogue among users regarding content that interests them on news pages they follow. It allows for diverse opinions and constitutes a crucial form of audience interaction (Eman Mohamed, 2023, p. 249).*
- 3. **Interact by Participation:** This mechanism enables users to share desired content from one page to another. It is a prevalent method of communication, contributing to the widespread dissemination of media content, including images and texts (Nouria Hamish and Hamida, 2017, p. 55).*

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## ***the impact of digital transformation on marketing and quality of banking services in Iraq***

***Rabia Atallah Al-Saadi***

*Master Degree in Business and Accounting  
Iraq University*

### ***Abstract***

*This study examines the impact of digital transformation on the marketing and quality of banking services in Iraq. It identifies the challenges faced by public and private banks in implementing digital transformation. The research focuses on preparing human resources and educating personnel to optimize marketing performance. The study found that digital transformation variables positively affect the quality of banking services and customer satisfaction in a competitive environment. However, there are shortcomings in infrastructure and the process of spreading digital transformation culture, particularly among consumers.*

*The study recommends the use of skilled human resources trained in modern technologies, developing cadres aligned with digital transformation, and focusing on infrastructure development, digital transformation, and marketing to achieve better quality, faster, and less expensive delivery of banking services to customers. The study emphasizes the importance of digital transformation, quality, electronic banking services, convenience of use, time, secrecy, security, and customer happiness.*

### ***Key words:***

*digital transformation, banking services, Iraq, private banks, consumers*

### **The introduction:**

*The globalization of banking activity and liberalization of financial and banking services have led to intense competition and technological development in the banking business environment. The adoption of digital technology has integrated digital information into financial institutions' infrastructure, generating goods and services to attract more consumers and clients. This has resulted in fierce competition between financial and banking institutions to market their services. To compete, electronic banking and delivery over the Internet are essential. Automated teller machines (ATMs) and electronic communications are essential channels for electronic banking services.*

*Banks must focus on satisfying customer demands to acquire their contentment. Government and commercial banks face a competitive climate, and their marketing portfolio must provide a variety of services to attract clients. Customer trust in government banks is larger than in private banks, motivating them to support their marketing direction.*

*This research aims to answer these questions by examining scientific and practical options for improving organizational performance and maintaining a competitive advantage in selling services. The study will focus on Iraqi banks and explore four axes: research techniques, theoretical framework, practical consideration, and conclusions and suggestions.*

### **Research problem:**

*To improve banking services, identifying deficiencies, gaining customer satisfaction, and gaining trust is crucial. Banks directly impact the national economy and investment. However, Islamic society often discourages dealing with banks, and government banks struggle with embracing digital techniques. The study explores the feasibility of digitally transforming public sector banking services, ensuring efficiency and client satisfaction, and assessing the impact of high-quality, user-friendly electronic banking on customer recruitment.*

### **The importance of the research:**

*The research aims to understand electronic marketing in financial institutions' operations, create strategies to enhance efficiency and diversity, improve customer satisfaction, and manage digital transformation concerns. It is crucial for the banking*



sector in Iraq, which is considered one of the most significant in the technological revolution.

### **Research objectives:**

*The text explores the civilized method of selling banking services online through the electronic revolution and its impact on service quality. It identifies challenges in adopting digital transformation in banks through electronic marketing and proposes procedures to enhance the approach to financial services, thereby boosting client confidence and satisfaction.*

### **Research hypothesis:**

*The study posits a positive correlation between digital transformation and the quality of banking services. It consists of three sub-hypotheses: the positive association between digital technology and digital customer service quality, the positive association between customer experience and digital customer service quality, and the positive association between digital technology and the quality of banking operations. The researcher used basic linear regression to validate these hypotheses.*

### **Search method:**

*This study utilized a descriptive approach, referencing sources like books, dissertations, university theses, periodicals, and internet sites. The researcher's personal experience as an employee in the banking sector, along with a survey list, was used to gather information. The data was then analyzed using the SPSS application.*

## **♣ Previous studies: (Studies focused on digital transformation)**

### **1. Salem Al-Enezi Study:**

*The study investigates the role of digital transformation in enhancing financial technology risk control mechanisms and its impact on electronic banking services in Kuwaiti banks during the Covid-19 crisis. The research used an inductive approach and statistical methods to analyze and classify financial technology risks, revealing that digital transformation in the governance system provides adequate results and maintains the integrity of digital banking operations. The study suggests that financial technology is a modern research area that offers fertile ground for future studies, addressing variables such as financial performance, market share, financial value*

chain, customer role in digital transformation, and the quality of banking service. The findings suggest that digital transformation is a vital tool for improving the efficiency and effectiveness of electronic banking services in the face of the COVID-19 pandemic (Al-Anazi 2020).

## **2. Wadih and Metwally Study:**

*The study examines the impact of Egyptian banks' digital products on their competitive position through three axes:*

- *Digital transformation requirements for banks.*
- *Designing digital products for banks.*
- *This reflects the competitive position of the banks under study.*

*The study used personal interviews and surveys with 12 bank leaders and 383 employees to identify discrepancies in digital transformation requirements between public and private banks. The research also revealed a discrepancy in designing digital products for targeted customers, affecting their competitive position. The researcher recommends that banking units adopt a digital transformation philosophy and design their products to support their competitive position, ensuring survival, growth, and continuity. This will help banks maintain their competitive position and ensure their survival and growth (Wadih 2020).*

### **♣ Studies focused on the quality of banking services:**

#### **1- Al-Naimat Study:**

*This study investigates the impact of the quality of banking services on performance in Jordanian banks. Results show that employees are generally aware of these dimensions and customer satisfaction, and the quality of banking services is influenced by both customer and financial perspectives. The study recommends increasing interest in tangible aspects of banking services and modernizing services through technology. The quality of banking services is crucial for the performance of Jordanian banks, and addressing these dimensions is essential for enhancing customer satisfaction and overall performance (Al-Naimat 2014).*

#### **2- Al-Taher study:**



The study aims to explore the effectiveness of quality banking services in enhancing banks' competitiveness. It highlights the challenges posed by global variables, such as the lack of parity between local and global competition due to the globalization of banking activities. The study suggests that developing banking services, staying updated with technological advancements, and focusing on service quality and customer satisfaction are key factors in enhancing and enhancing banks' competitiveness (Al-Tahir 2015).

### **3- Jumaa Study:**

The study analyzed the impact of banking marketing on improving the quality of Egyptian services. It found a significant relationship between marketing and service quality. The key recommendations were the use of marketing programs to inform customers about new developments and services that meet their needs, requirements, and desires (Jumaa 2017).

### **♣ The second axis / theoretical framework**

#### **Banking shopping:**

Banking marketing is a strategic approach to managing banking services, aiming to meet market demands and satisfy customer needs while generating profit for the bank. It involves activities that bank employees perform to meet customer expectations and gain loyalty. Banking marketing is a dynamic movement that ensures the flow of banking services and products, such as borrowing and lending, to customers, ensuring their satisfaction and continued dealings with the bank. Banking marketing is defined as the invention, innovation, and delivery of banking services that create happiness and contentment among recipients while generating profit for the bank. It is not manufactured or kept in the same way as other items, as they are delivered as soon as the consumer wants them. Bankers must be experts in offering services to each client individually and efficiently, without showing a sample to obtain prior consent. Banking services are not a service, but rather a product that can be examined according to set criteria. Employees must provide services that retain customers and continue doing business with the bank. Financial services are created and consumed simultaneously at the point of completion, and clients cannot transfer or exchange them with others. Banking services cannot be monopolized by removing them from the market and placing

them in the hands of a single monopolist. Instead, they are exposed to market competition among banks to acquire consumers by delivering the best services.

### **Stages of banking marketing:**

The banking industry has evolved through several stages, each with its unique challenges and opportunities. The first stage involves producing and providing banking services, which is characterized by an increase in demand over supply. This can be achieved through expanding branches, increasing employees, offering new services, and increasing production to meet demand.

The promotion phase involves advertising and promoting banking services to attract new customers, maintain existing ones, and increase the size of the bank's customer base. The promotion process is linked to the relations department, which identifies customers' needs and advertises them to attract them.

The second stage involves personal attention to customers, which involves meeting their needs and gaining their satisfaction. Banks use this approach to create an atmosphere of friendship between the bank and its customers, provide guidance on the type of service that can benefit them, and use the latest technology to provide service quickly and provide comfortable waiting rooms.

The third stage is renewal and innovation, where banks focus on improving the quality of services they provide and providing new services to meet customer needs and achieve goals. This includes studying customer behavior and orientations to provide services that fulfill their desires and keep pace with development.

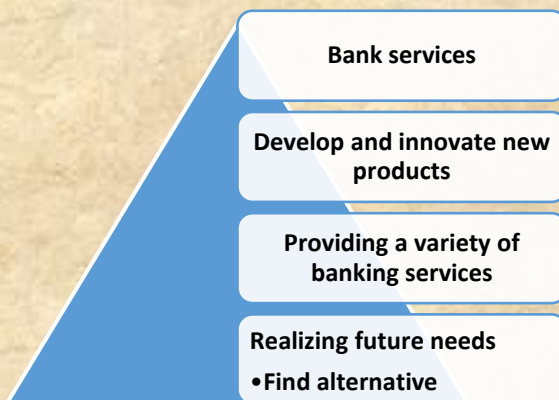
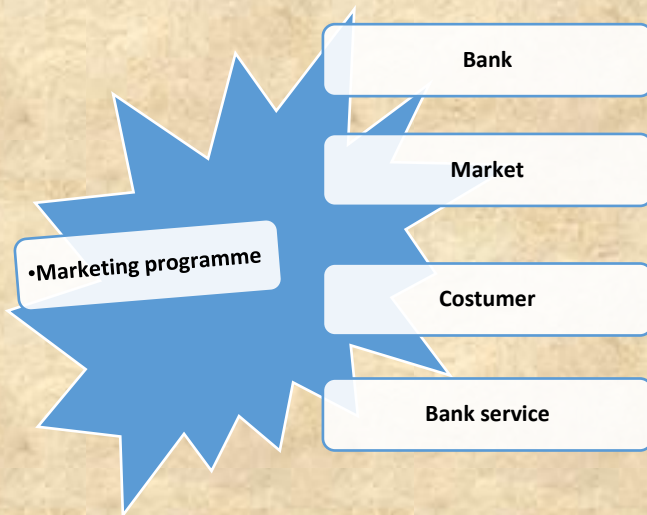
The fourth stage is marketing information systems, where banks practice marketing activities within integrated information systems, prepare and monitor marketing plans, develop marketing research and information, support marketing communications systems, and prepare short- and long-term marketing plans that serve both the bank and the customer.

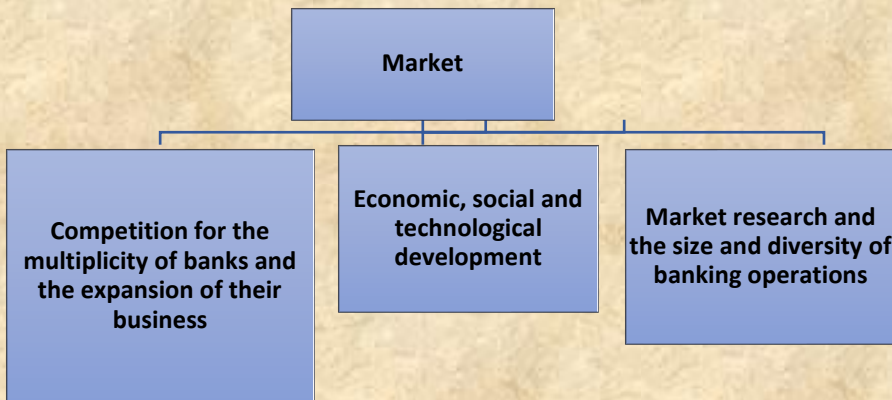
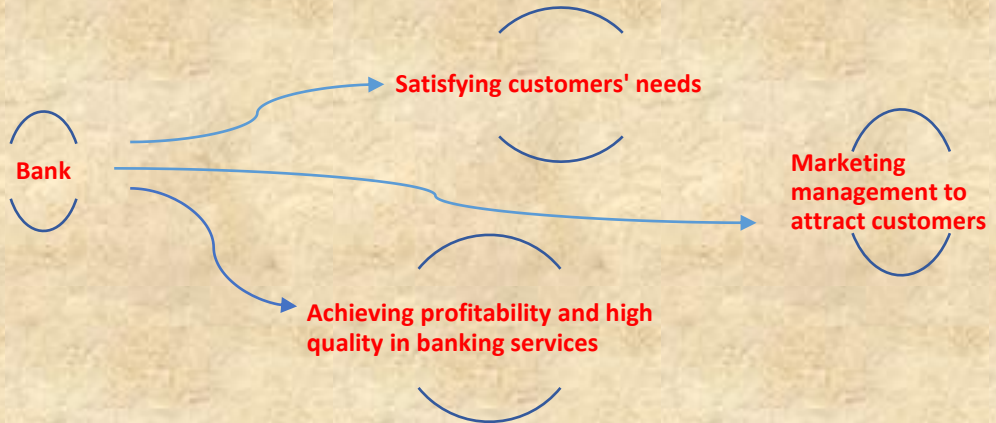
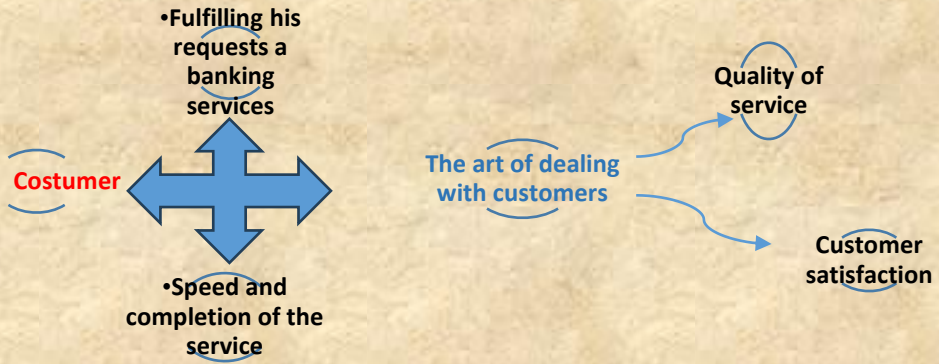
The fifth stage focuses on a specific sector of the market, where banks specialize and pay attention to specific segments of the market. This involves developing a specific marketing program that suggests different services provided by the bank, distinguishing it from other banks.



*In conclusion, the banking industry has evolved through various stages, each with its unique challenges and opportunities. By embracing these changes and adapting to the changing market landscape, banks can ensure stability and growth in the ever-evolving banking industry (Lami).*

*The researcher proposes a marketing strategy for banking services, focusing on the following components:*







*Banking marketing plays a crucial role in a bank's management by conducting regular research to understand the volume and diversity of operations, customer quality, and preferences. It also involves innovating new banking services to attract the largest number of customers while studying competitors' services and plans. It also explores future customer needs and explores ways to meet them by opening new units or finding alternatives. Bank employees are also educated on the concept of banking marketing and its impact on management. Promotional campaigns are prepared and implemented to meet customer requests, speed transactions, and service quality. The bank's marketing activity is evaluated and updated to suit economic and technological development.*

### **Marketing environment:**

*The private banking environment is a complex interplay of external variables that directly impact a bank's activity and goal achievement. It includes competitors, who compete to win the largest market share represented by banking clients. The most important elements of this environment include customers, who consume the bank's services, and the social concept, which emphasizes satisfying customer needs effectively and efficiently. Banks must define their target market and divide the market into sectors to adopt appropriate marketing strategies. The social concept focuses on integrating societal needs with the bank's functions, aiming to achieve society's goals rather than just profitability. Banks face two types of competition: direct competition, which occurs between banks that provide similar services, and indirect competition, which is non-price competition based on the quality and differentiation of banking services provided to customers. Failure to be prepared and aware of these competitions could lead to losing market share. In summary, the private banking environment is a complex interplay of customers, competitors, and social concepts, all of which play a crucial role in a bank's success (Taha 2000).*

*Banks compete with other financial institutions offering similar services, such as insurance and savings funds, to attract savings. Suppliers provide the bank with materials and services, and management must ensure a continuous flow of quality materials at appropriate prices. Government regulations govern the*

environment and influence bank policies and activities. The global trend is to reduce compliance with bank procedures to allow banks to compete and adapt to globalization. Crowds, or pressure groups, exert pressure on banks, influencing policies and performance. Major shareholders are the most prominent pressure groups. There are three main groups: those with common interests with the bank, those interested in the bank, and those the bank cares about, such as the media and newspapers. These groups influence the bank's policies and performance, and banks seek to improve their image with customers by having newspapers publish news about them. The competition between banks and other financial institutions is crucial for maintaining competitiveness and standing up to globalization (Al-Haddad 1999).

### **Political and legal conditions:**

Political and legal conditions significantly influence a bank's marketing activity, as political stability ensures the best possible environment for the bank to carry out its activities. This is influenced by laws and legislation, such as those governing consumer credit, branch opening, and allowing foreign banks to open in the local market. Social and cultural factors also play a role in how the bank manages and deals with customers, affecting their educational level and lifestyles. The bank's marketing manager must consider these factors when developing marketing policies and strategies, as they influence customers' tendency to save, spend, and borrow. The banking industry is highly affected by technological development, which has greatly impacted the diversity and multiplicity of banking services. Bank managers must navigate these challenges by making appropriate changes in their strategies and enabling banks to innovate new products and services for customers. Overall, the banking industry is influenced by various factors, including political stability, social and cultural factors, demographic environment, and technological advancements (Zidane 2000).

### **Digital structure:**



Digital transformation in the banking sector has been a significant shift in recent decades, focusing on the use of digital technologies to enhance banking services, improve production efficiency, and achieve superior performance. This transformation involves integrating digital technology into all business areas, transforming from local computers to cloud computing, and designing a distinctive business system that fully invests in communications and information technology. This includes smart choice of customers and service beneficiaries, designing mechanisms for excellence, and encouraging human resources to work in the organization. Digital transformation aims to enhance efficiency and quality in banking services, provide a comfortable and safe banking experience for customers, and reduce operational costs. It is crucial for banks to maintain their competitiveness and improve financial performance by providing innovative and advanced digital banking services. Digital banking services have become a strong alternative to traditional banks, allowing customers to send and receive money, make digital payments, and purchase products online. These services also include features provided via mobile applications or personal computers, allowing users to conduct their financial transactions and meet their needs for various services in banks (Ali N/D).

According to the researcher, one of the critical steps that must be taken to maintain bank competitiveness and improve financial performance is to provide innovative and advanced digital banking services to customers, which can be accomplished by using modern technologies in banks that will improve the efficiency of banking operations and facilitate the conduct of banking operations. Financial transactions: People no longer need to visit traditional banks to do financial transactions, payments, or other activities. Customers may now build an immediate balance, a wallet for financial services, a bank account, and so on without leaving their rooms. That is, digital banking services have emerged as a viable alternative to banks since they are used to send and receive money, make digital payments, purchase things online, and provide a variety of additional financial services that satisfy the demands of all clients. Digital banking services also comprise all the features that are available through mobile phone applications or the user's personal computer, allowing him to effortlessly

perform financial transactions and satisfy the demands of clients for various services in banks.

### **Digital financial services:**

*Digital financial services are information and internet-based financial services that allow customers to conduct banking operations through digital methods, such as withdrawals, credit, transfer operations, and securities dealing. The Covid pandemic has significantly accelerated the adoption of digital banking services, creating digital platforms for banks worldwide. The advantages of using electronic banking services include ease of conducting transactions, improved banking services, speed and saving time and effort, reduced operational costs, improved security and protection, enhanced competitiveness, and reduced errors. Digital banking services provide various types of transactions without the need for traditional banks or ATMs. Digital transformation allows banks to access accounts and conduct banking operations via the internet and mobile applications, allowing for faster and more efficient transactions. This saves time for companies and individuals, allowing them to focus on other accomplishments. Reducing operational costs, improving security, and enhancing competitiveness are also benefits of digital transformation. Banks can use the latest technologies to protect their customers' data and transactions from hacking and electronic fraud, ensuring the authenticity of funds, transactions, and account details. In conclusion, digital financial services offer numerous advantages, including improved efficiency, reduced costs, enhanced security, enhanced competitiveness, and reduced errors. By adopting digital transformation, banks can enhance their competitiveness and improve customer relationships, ultimately leading to increased financial transformations and improved profits (Natarajan 2020).*

### **Digital transformation requirements:**

*Digital transformation in the banking sector involves several challenges, including investing in modern technology, enhancing customer digital awareness, providing necessary training, and ensuring security and protection. Banks must*



also train and qualify employees to use modern technologies effectively. Legal and regulatory challenges arise, as banks must adhere to regulations related to electronic protection and security. The high cost of converting traditional business processes to digital ones is expected to improve financial performance. However, digital banking transformation also presents economic challenges, as it requires a significant investment in technology. Despite these challenges, digital banking transformation can help banks improve their competitiveness and market share, enhancing their ability to compete with modern competitors (Natarajan 2020).

According to the study, the future of financial services and customer happiness will be built on a more flexible, non-cash technology civilization that is skilled in using digital services with extraordinary ease. Blockchain databases, for example, are emerging technologies that may be utilized to revolutionize a cashless economy. As a result, contemporary communication technologies minimize the cost of infrastructure, which aids in the expansion of banking activities. Digital banks, reception offices, and employees qualified for electronic business will be the digital bank's interface in the future and will be able to provide banking services such as connecting to the bank from anywhere and at any time, cashless and paperless transactions, and automated transaction processing, all of this will improve client satisfaction and increase their value.

### **Electronic payment in Iraqi banks:**

Iraq has transitioned to electronic payment systems since 2004, transforming the banking sector from manual to automated. The Central Bank of Iraq introduced electronic payment in 2004, facilitating the circulation of funds between banks and financial institutions. The system is managed by operators, with central banks responsible for managing and operating payment systems. Electronic payment plays a crucial role in distributing funds for economic activities and is considered a social infrastructure. Banks are adopting automated financial systems and networks to link banks and financial institutions, conducting payment and clearing operations. This enables automatic financial transfers, ensuring they reach the beneficiary at a specific time. This modern

communication base allows banks to provide advanced banking services and enhances financial performance. The RTGS (Real Time Grosse Settlement) system is a specialized system for transferring money and securities in real time and on a gross basis. It is not subject to waiting periods for high-value payments and settles each payment individually and immediately in real time. The ACH electronic clearing system (Automated Clearing House) and RPSI (Retail Payment System Infrastructure) are among the types of electronic payment used in Iraq. These systems aim to optimize the use of funds and encourage investors while avoiding risks from direct trading in securities. The Central Bank of Iraq implemented a system on 8/24/2006, settling payments individually without grouping them with other payment processes. Once processed, payments are final, irrevocable, or cancelable. The Central Bank is linked to the main bank branches and the Ministry of Finance ( The Central Bank of Iraq 1998).

The ACH electronic clearing system is an electronic exchange of magnetic instruments between banks, enabling the organization of checks and payment orders at one time, place, and electronically. It was implemented by the bank at the Iraqi central office on September 14, 2006. The objectives of this system include reducing time, costs, confidentiality, and risk of manual exchanging instruments, as well as implementing non-cash payments effectively through electronic transfers between customers instead of cash deposits (Al Masoudi 2016).

RPSI Retail Payment System Infrastructure is a system for transferring money and payments of relatively low value made by individuals and companies, such as salary payments, online shopping payments, utility bills, and other obligations. It processes many payments on the same day, with the Central Bank being the system operator and sponsor. This system contributes to revitalizing the local market and reducing cash dealing, creating an atmosphere of competition between banks to provide new services to attract customers, encourage investors, revive the local economy, and provide job opportunities (Al -Shammari 2008).

There are various types of retail payment systems, including electronic bank cards (plastic cards), automated teller machines (ATMs), electronic points of sale



(POS), and mobile phone payments. Credit cards have a specific credit ceiling for withdrawals and annual fees and interest on unpaid balances. Debit cards allow users to pay for purchases directly from their current account at the bank. Prepaid cards are not linked to a bank account but loaded with a certain balance, allowing shopping within the limits of the balance loaded into it (Rahim 2017).

Automated teller machines (ATMs) are electronic devices that allow users to use machine-readable plastic cards to withdraw money from their accounts or other services. Electronic Points of Sale (POS) are machines deployed in institutions, commercial, and service stores, deducting amounts from customers' accounts electronically by swiping the card into the device and linking it to the customer's account at the bank (Safar 2008).

In 2005, the Central Bank of Iraq granted a license to two companies (Asia Hawala and Iraq Wallet) to work as service providers for mobile phone payments (The Central Bank of Iraq 1998).

### **The Practical side:**

The research used statistical analysis to prove hypotheses. A questionnaire was distributed with 25 statements representing the dimensions of the research variables. The questionnaire was designed based on the research topic, objectives, and questions, and included three parts: personal data, items related to digital transformation, and items related to the quality of banking services. The questionnaire consisted of 150 questionnaires, 132 of which were retrieved. Table No. (1) displays the research variables, measurement items, and question codes. The questionnaire was designed after reviewing previous studies and the researcher's practical experience.

**Table 1**  
**Research variables, measurement elements, and question codes**

<i>Variable</i>	<i>Dimensions</i>	<i>Symbol</i>	<i>Number of Questions</i>
<i>(independent variable)</i>			
<i>Digital transformation</i>	<i>Digital technologies</i>	<i>X1</i>	<b>9 of (1 – 9)</b>
	<i>Customer experience</i>	<i>X2</i>	<b>6 of (10 – 15)</b>
<i>(dependent variable)</i>			
<i>Quality of banking services</i>	<i>Digital customer service</i>	<i>X1</i>	<b>5 of (16 – 20)</b>
	<i>Transforming banking operations digitally</i>	<i>X2</i>	<b>5 of (21 – 25)</b>

**Table 2**  
**Likert scale scores**

The sample members' responses to scale items were assessed using a five-point Likert scale.

<i>Completely disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Completely Agree</i>
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>

**Table 3** Level of importance of sample members' responses to Likert scale items  
The level of importance was determined using the equation  $(5 - 1) \div 5 = 0.080$ , as shown in Table No. 3.

<b>Level of importance</b>	<b>Weighted average</b>
<i>Very weak</i>	<i>Less 1.80</i>
<i>Weak</i>	<i>From 1.80 to less than 2.60</i>
<i>Medium</i>	<i>From 2.60 to less than 3.40</i>
<i>High</i>	<i>From 3.40 to less than 4.20</i>
<i>Too high"</i>	<i>From 4.20 to less than 5</i>



The research tool's validity and reliability are assessed through its internal consistency and apparent consistency. Internal consistency is determined by calculating the correlation coefficients between each statement of the questionnaire and the total score for the dimension. The results show that all 9 statements of the digital technologies dimension have statistically significant correlations with the total score of the dimension to which they belong, at a significance level of 0.01, indicating that the statements are true to what they were designed to measure. On the other hand, construct validity measures the achievement of the tool's goals by showing the extent to which each dimension of the research is related to the total score of the dimensional phrases. The correlation coefficients of each dimension of the questionnaire with the total score in the exploratory sample  $N = 30$  was used to calculate the internal consistency of the questionnaire.

**Results of the field study:**

The field study utilized the SPSS package for statistical analysis, including arithmetic means, standard deviations, and weighted average percentages for descriptive analysis, Simple Linear Regression Analysis for determining the effect of the independent variable on each dimension of the dependent variable, and Stepwise Multiple Regression Analysis for determining the effect of dimensions on the dependent variable.

**Table 4 Standard deviations, and responses of the research sample towards digital technologies,  $N = 132$**

Digital technologies	SMA	standard deviation	Weighted average percentage	Level of importance
TBI Bank	4.32	0.82	8.64	Very High
Baghdad Bank	4.27	0.780	8.53	Very High
Rasheed Bank	3.85	0.95	77	High
Rafedain Bank	3.97	0.83	7.94	High
Total	4.10	0.845	82	High

research sample's responses to digital technologies in the banking sector showed a high degree of remoteness, with a total score of 4.10, a standard deviation of 0.845, and a percentage of 82%. This indicates a decrease in dispersion and convergence of opinions. Private banks showed a higher degree of remoteness of digital technologies compared to public banks, indicating an increase in digital technologies in private banks.

**Table 5**

**Standard deviations, and responses of the research sample towards the customer experience, n= 132**

<i>Digital technologies</i>	<i>SMA</i>	<i>standard deviation</i>	<i>Weighted average percentage</i>	<i>Level of importance</i>
<i>TBI Bank</i>	<i>4.490</i>	<i>0.637</i>	<i>89.8</i>	<i>Very High</i>
<i>Baghdad Bank</i>	<i>4.61</i>	<i>0.605</i>	<i>92.2</i>	<i>Very High</i>
<i>Rasheed Bank</i>	<i>4.26</i>	<i>0.725</i>	<i>85.2</i>	<i>Very High</i>
<i>Rafedain Bank</i>	<i>4.31</i>	<i>0.703</i>	<i>86.2</i>	<i>Very High</i>
<i>Total</i>	<i>4.42</i>	<i>0.667</i>	<i>88.4</i>	<i>High</i>

The research sample's responses to the customer experience dimension in the banking sector were analyzed. The total score for the dimension was high, reaching 4.385 with a standard deviation of 0.689. The percentage reached 87.70%, indicating a decrease in dispersion and convergence of opinions. Private banks had slightly higher remoteness of customer experience than public banks, but both had high levels. The study also showed a high degree of digital customer service in both sectors.



**Table 6**

*Standard deviations, and responses of the research sample towards the digital customer service dimension, n=132*

<i>Digital technologies</i>	<i>SMA</i>	<i>standard deviation</i>	<i>Weighted average percentage</i>	<i>Level of importance</i>
<i>TBI Bank</i>	<i>4.490</i>	<i>0.637</i>	<i>89.8</i>	<i>Very High</i>
<i>Baghdad Bank</i>	<i>4.61</i>	<i>0.605</i>	<i>92.2</i>	<i>Very High</i>
<i>Rasheed Bank</i>	<i>4.26</i>	<i>0.725</i>	<i>85.2</i>	<i>Very High</i>
<i>Rafedain Bank</i>	<i>4.31</i>	<i>0.703</i>	<i>86.2</i>	<i>Very High</i>
<i>Total</i>	<i>3.74</i>	<i>0.667</i>	<i>88.4</i>	<i>Very High</i>

*The research sample's responses to digital customer service dimensions in the banking sector showed a high degree of convergence, with a total score of 4.42, a standard deviation of 0.667, and a percentage of 88.4%. This indicates a low dispersion of opinions and a higher degree of digital customer service in private banks compared to public banks, despite being high in both sectors.*

**Table 7 Standard deviations, and responses of the research sample towards banking operations, N =132**

<i>Digital technologies</i>	<i>SMA</i>	<i>standard deviation</i>	<i>Weighted average percentage</i>	<i>Level of importance</i>
<i>TBI Bank</i>	<i>3.82</i>	<i>0.814</i>	<i>76.4</i>	<i>High</i>
<i>Baghdad Bank</i>	<i>3.89</i>	<i>0.806</i>	<i>77.8</i>	<i>High</i>
<i>Rasheed Bank</i>	<i>3.75</i>	<i>0.848</i>	<i>75</i>	<i>High</i>
<i>Rafedain Bank</i>	<i>3.72</i>	<i>0.875</i>	<i>74.4</i>	<i>High</i>
<i>Total</i>	<i>3.74</i>	<i>0.836</i>	<i>74.8</i>	<i>High</i>

The research sample's responses to the quality dimension of banking operations were analyzed in a table. The total score for the quality dimension was high, with a mean of 3.74 and a standard deviation of 0.836. The percentage reached 74.8%, indicating a decrease in dispersion and convergence of opinions. Private banks had a higher quality dimension of banking operations compared to public banks, despite their high standards.

**Results of testing the research hypotheses:**

The study hypothesizes a positive, statistically significant relationship between digital transformation and the quality of banking services. It divides this hypothesis into sub-hypotheses, with the first hypothesis proving the relationship between digital technologies and digital customer service quality using simple linear regression.

**Table 8**

*Shows the results of a simple linear regression analysis of the impact of digital technologies on the quality of digital customer service.*

Variable Function	Association R	The Coefficient of Determination R2	Calculated F	Significance Level Sig	Degrees of Freedom	Regression Coefficient B	Calculated T	Significance Level Sig
Quality Digital Customer Service	0.549	0.301	37.881	0.00	Regression = 1 The Rest = 131 Total = 132	0.240	6.155	0.00

The study reveals a significant relationship between digital technologies and the quality of digital customer service in banking services. The correlation coefficient R is 0.549, and the degree of influence B is 0.240. An increase in digital technologies leads to a decrease in digital customer service quality. The F value is 37.881, and the T value is 6.155. The first hypothesis states that digital technologies positively influence the quality of digital customer service, while the second hypothesis suggests a positive relationship between customer experience



and digital customer service quality. The researcher used simple linear regression to verify the validity of these hypotheses.

**Table 9**

*Shows the results of a simple linear regression analysis of the effect of customer experience on the quality of digital customer service.*

<i>Variable Function</i>	<i>Association R</i>	<i>The Coefficient of Determination R2</i>	<i>Calculated F</i>	<i>Significance Level Sig</i>	<i>Degrees of Freedom</i>	<i>Regression Coefficient B</i>	<i>Calculated T</i>	<i>Significance Level Sig</i>
<i>Quality Digital Customer Service</i>	0.706	0.498	16.242	0.00	Regression = 1 The Rest = 131 Total = 132	0.240	4.616	0.00

The study reveals a significant relationship between customer experience and the quality of banking services. The correlation coefficient R is 0.706, and the coefficient of determination R2 is 0.498. The degree of influence B is 0.342, indicating that an increase in customer experience leads to an impact on digital customer service quality. The significance of this effect is confirmed by the calculated F value (16.242) and T value (4.616). The second hypothesis, "There is a positive, statistically significant relationship between the customer experience and the quality of digital customer service," is fulfilled, and the third hypothesis, "There is a positive, statistically significant relationship between digital technologies and the quality of banking operations," is also supported.

**Table 10 Shows the results of a simple linear regression analysis of the impact of digital technologies on the quality of banking operations.**

Variable Function	Association R	The Coefficient of Determination R2	Calculated F	Significance Level Sig	Degrees of Freedom	Regression Coefficient B	Calculated T	Significance Level Sig
Quality Digital Customer Service	0.53	0.28	11.034	0.00	Regression = 1 The Rest = 131 Total = 132	0.312	4.714	0.00

The study reveals a significant relationship between the dimension of digital technologies and the quality of banking operations. The correlation coefficient R and coefficient of determination R2 indicate that a change in the quality of operations results from the change in digital technologies. The degree of influence B is 0.312, indicating that an increase in digital technologies leads to an impact on the quality of banking operations. The calculated F value and T value confirm this effect. The third hypothesis, which states a positive, statistically significant relationship between digital technologies and the quality of banking operations, is fulfilled, while the main hypothesis, which states a positive, statistically significant relationship between digital transformation and the quality of banking services, is also confirmed. The results support the hypothesis that digital transformation is positively correlated with the quality of banking services. The study reveals a significant impact of digital transformation on the quality of banking services in the banking sector. TBI and the Bank of Baghdad have higher quality services than Al-Rasheed and Al-Rafidain Banks due to their use of electronic work and higher volume of electronic transactions. The employees in these banks are qualified and experienced, providing flexibility, speed, and diversity of services to satisfy customers and attract them in the face of competition. The increase in investment in digital transformation, particularly in infrastructure, is due to the significant value of it. The size of customers' deposits also allows them to invest, and the value and volume of daily transactions, particularly related to government transactions, contribute to the success of these banks.



## **Conclusions and recommendations:**

*The competitive environment has made it challenging for financial institutions and individuals to maintain success and excellence. To overcome these challenges, they must face problems and seize opportunities. This requires a combination of effort and creativity. Ensuring workforce development, building digital marketing expertise, and focusing on employee psychology can positively impact performance and achievement indicators for both individuals and organizations.*

## **Conclusions:**

- *When compared to government banks, private banks are more concerned with the type of service and are more equipped to prepare human resources for effective electronic marketing performance.*
- *It was discovered that, in contrast to private bank managers, most government bank managers do not understand the significance of digital transformation.*
- *Government banks' lack of interest in customers' demands and aspirations, indicating a lack of flexibility in their financial operations and the absence of the notion of modern digital transformation.*
- *failing to pay attention to the external and internal look of bank buildings, as well as failing to provide customers with the essential services when they are in the bank.*
- *Failure to keep up with technical advancements in banking services as compared to commercial banks.*
- *The absence of quality performance in what banks deliver in general, whether in the quality of services or in how these services are given, because of the bank's poor electronic marketing direction and failure to raise client knowledge about digital transformation.*
- *The lack of many electronic banking services, which resulted in customers dropping out and turning to alternatives other than banks, such as banking and transfer offices, causing banks to lose cash liquidity for the purpose of trading it for various other services, such as bank credit to obtain a financial return, represented by interest and various fees.*

## **Recommendations:**

- ✓ *Increasing the efficiency of digital workers and providing ongoing training on dealing with digital services and clients.*
- ✓ *Extending the financial service system to facilitate more digital transformation in the banking industry, particularly the government sector, which now lacks such a system.*
- ✓ *Promoting a culture of digital transformation implementation among bank workers and encouraging them to increase efforts to educate citizens about the necessity of digital transformation, accessible services, and how to use them.*
- ✓ *Increasing investment in electronic security software, preventing piracy, and safeguarding financial networks through legislation that holds them accountable, protects the consumer, and ensures the security and secrecy of his transactions.*
- ✓ *Increasing the range of digital banking services to fulfill the requirements and wants of the most often used clients, as well as offering ATMs that are still insufficient for banking transactions and decreasing credit risks.*
- ✓ *Marketing digital services to conventional consumers who are not digitally literate, as well as organizing a session for them through banks to raise digital awareness.*
- ✓ *Increasing the availability of new digital banking services that keep up with increasing technological advancement.*

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*Democratic Arab Center  
For Strategic, Political & Economic Studies  
Berlin / Germany*

*Email*

*[book@democraticac.de](mailto:book@democraticac.de)*



المركز الديمقراطي العربي

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