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Assist. Prof. Mehmet Sait Korkmaz, Ph.D.

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Editor in Chief
Assist. Prof. Mehmet Sait Korkmaz, Ph.D.

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Platanus Publishing®
Address: Natoyolu Cad. Fahri Korutürk Mah. 157/B, 06480, Mamak,
Ankara, Turkey.

Phone: +90 312 390 1 118
web: www.platanuspublishing.com
e-mail: platanuskita@gmail.com



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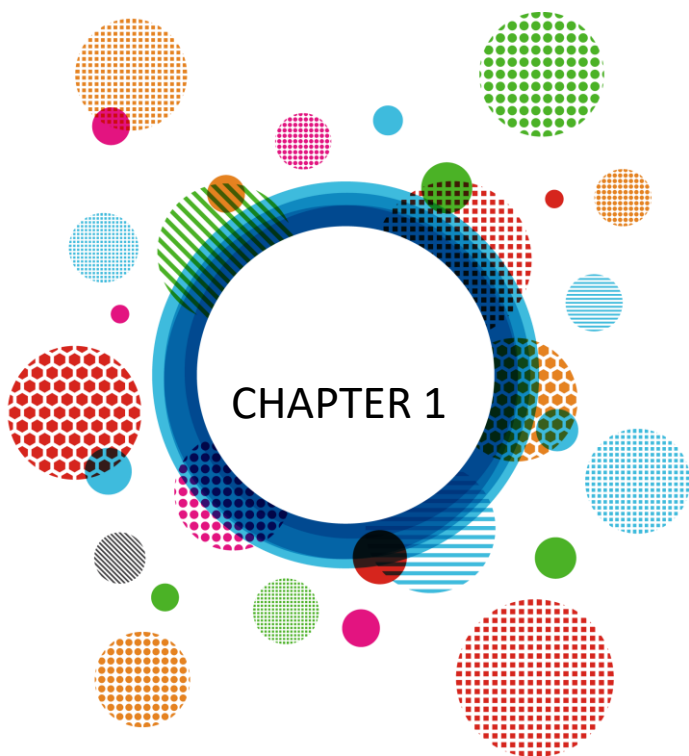
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**Public history and slavery: two French and two
Francophone cases (particularly Guadalupe)**

Sheyla Moroni

Public History is often seen as a response to "memories without history," an antidote to narratives that, through omission or manipulation, impoverish understanding of the past. In line with AIPH's proposed goals, it is shaped as a tool that promotes historical knowledge and the use of research methodologies to a diverse audience, fostering multidisciplinary dialogue. In this way, public history not only enhances practices and experiences that actively involve groups and communities, including through digital tools, but also aims to counter the "abuse of history," understood as practices of distortion and mystification of the past aimed at manipulating public opinion. At the same time, it is concerned with the enhancement of a country's historical, cultural, tangible and intangible heritage, offering professional skills that enable it to face contemporary challenges through a critical and informed approach.

Neil Siberman underscored the importance of museums and memorials, pointing out that such spaces are key tools for documenting diversity, affirming identity and establishing universal principles. In particular, museums and installations dealing with slavery face the complex challenge of documenting articulated otherness, addressing both the descendants of slaves and the original communities of the regions involved. Indeed, such institutions must not only avoid denying or erasing the past, but promote the construction of new plural and transcultural identities based on shared universal principles.

There are numerous models of museums and installations that address slavery's past from different perspectives. France, in particular, is a paradigmatic case, having paved the way for 'Francophone' initiatives overseas as well. In this context, to fully understand the impact of public history on the reappropriation of the memory of slavery, it is essential to examine the "public places" that commemorate the dead and deported, providing a space of memory for the citizenry that likely includes their descendants.

Two French ports

France was a key pillar of the Atlantic trade for at least two centuries until the slave system was finally abolished: initially during the French Revolution and later in 1848. These milestones represent pivotal moments that highlight how the nation's history is intimately tied to that of slavery. Unlike other European nations, France maintains an intricate and ambivalent relationship with this chapter of its past; On the one hand, it stands today as a defender of human rights and promoter of universal values, while on the other it struggles to recognize its role as a protagonist in a system that, though neglected, contributed substantially to the formation of the world order.

Among the ports most involved in this historically problematic context are Nantes, Bordeaux, and La Rochelle, each of which developed its own way of

dealing with its legacy. In particular, Nantes stands out for the enormous volume of trade that characterized its activity: an estimated 540,000 people were transported, spread over 1,700 shipments, a figure that testifies to the intensity and economic importance of trade in that city. Since the 1980s, thanks to the intense activity of historians and the growing interest of civil society, the subject of the slave trade - long relegated to a marginal or even hidden role - has gradually been resurgent. An international conference, held in 1985 in Nantes, marked a decisive turning point, triggering a heated debate that brought to light the multiple implications of that slave past and stimulated critical reflection on historical memory.

Parallel to its role in trafficking, Nantes has been able to establish itself as a dynamic center of innovation and culture, also recognized as the cradle of "social Christianity" in France. In 1992, leftist mayor Jean-Marc Ayrault authorized the mounting of an exhibition dedicated to trafficking and slavery, an event that attracted 400,000 visitors. This initiative was not only a turning point for the recognition of the city's historical memory, but also a catalyst for a national debate that led, in 2001, to the passage of the world's first law recognizing the slave trade as a crime against humanity. This commemorative journey highlights how the recovery of memory can have a profound impact on the social and political fabric, contributing to critical reflection on past injustices and a process of historical reconciliation.

The ongoing debate is further enriched by the actions of associations such as "Memory of the Overseas," which bring together descendants of slaves and promote a decolonization of thought, inviting a critical reconsideration of official narratives. Public history, in this context, stands as an indispensable tool for translating the pain and injustice of the past into a lesson in social justice, through the creation of memorials and exhibitions that reflect their complex legacy.

Over the past four decades, the phenomenon of immigration has helped reignite the debate on the memory of slavery in Nantes, highlighting the complexity of the relationship between the city and its past. The inauguration of the Memorial for the Abolition of Slavery in 2012 was a decisive step toward historical awareness, offering a meeting place between past and present. However, despite the progress, Nantes continues to face challenges related to racism and vandalism that challenge the effectiveness of the reconciliation journey undertaken. In this context, the open and inclusive dialogue fostered through cultural initiatives and civil society involvement is a virtuous model for addressing a dark chapter in European history and stimulating deeper reflection.

Bordeaux and Aquitaine: between shadows and lights

Bordeaux, along with the Aquitaine region, has long-standing historical relations with the African continent, characterized by a dual nature: on the one hand, the heavy shadow of the slave trade; on the other, a light that is expressed through cultural, academic and solidarity initiatives. Today, the African continent occupies a central role in the socio-cultural fabric of the region, whose specificity is manifested in its historical, economic and cultural ties.

The action of the Institut des Afriques, for example, is structured around three main missions: to promote and support activities related to Africa through events, conferences, study days, exhibitions, libraries and artistic events; to foster collaboration among the various players in the academic, cultural, associative and artistic scene, with a view to innovation in territorial public policies; and to enhance, at the national and international level, the specificity of ties with the African continent, adopting an ever-renewed approach.

These initiatives testify to the commitment to integrate historical memory with cultural and social development, transforming the past into a shared heritage capable of fostering intercultural dialogue and strengthening a sense of collective identity.

Since its creation in 1989, MIGRATIONS CULTURELLES aquitaine afriques (MC2a) has affirmed its desire to give visibility to artistic expressions from Africa, particularly in the territories of Aquitaine and Bordeaux. Co-founder in 2015 of the Institute of Africas (IdAF), MC2a brings forward a renewed vision of the African world, in collaboration with the University and institutions (communities, museums, art centers, etc.). MC2a is a cultural player; its field of expertise extends to performing arts, event projects and educational actions. Located in the Grand-Parc neighborhood of Bordeaux since July 2016, Annex B of the Charter of Fundamental Rights of the European Union has become an important social theme for MC2a, offering workshops, artist residencies, and actions with the public and schools. Through sharing with artists and supporting local and territorial communities, MC2a brings a tool for artistic and civic development to the heart of the Metropolis and the Grand-Parc, a neighborhood under renovation.

Rahmi, the Network of Actors in Immigration History and Memory, was founded in 2007 to work for knowledge and recognition of immigration history and memory: it has also sparked a debate on the issue of the slave trade in order to change representations, combat prejudice and reinforce principles of "living together." Through this approach, Rahmi strives to highlight the contributions of immigrant populations to society as a whole. The association, based in Bordeaux, is made up of public, private and associative structures throughout New

Aquitaine. Rahmi also fits into a nationwide network logic by being a member of the National Museum of Immigration History's network of actors since 2007 and by composing the associative collective Inter-Réseaux Mémoires-Histoire since 2015.

One NGO, A la Source, has yet to be among the social and cultural actors: it was created in 2015 with the aim of developing international solidarity activities by enabling socio-cultural contribution in target countries. Starting from a personal experience of identity research, the NGO addresses historical, memorial, cultural and social issues related to the tragic history of the slave trade and slavery. Contemporary societies in Europe, Africa and the Americas have been strongly influenced by this history. Strong cultural ties have been established between these 3 continents. With this in mind, the NGO A LA SOURCE organizes an annual cultural event for the public in Bordeaux and the region. It tries through different means (readings, theatrical creation, exhibitions, concerts, fashion shows, digital art, etc.) to give humanity to this tragic history. The association develops its action around a strong axis that is popular education to shared memory

Continuing to analyze the civil society of the city involved we find the May 10 Collective that focuses on organizing for a responsible commemoration of the struggles against slavery and the slave trade, while the Kalina' Go association promotes and disseminates the cultural arts of France overseas; whether they take place in France or abroad, the events offered by Kalina' Go reflect its multidisciplinary approach. The initiative combines cultural and recreational gatherings to enable the emergence of the arts and an entire community through the gateways it supports.

The association Les Anneaux de la Mémoire aims to carry out cultural projects on the themes of memory, the history of the slave trade and its legacies. The association works locally and internationally in close collaboration with a large number of cultural actors, researchers and activists

The Foundation for the Memory of Slavery aims to recognize and integrate the decisive role of colonial slavery in the official narrative of French history, so that the multiple heritages-political, cultural, and human-associated with it can be fully recognized and valued. The Foundation's fundamental goal is to use historical knowledge as a tool to counter racism and discrimination, turning knowledge of the past into a means to promote social justice and inclusion.

Recognized as a nonprofit organization, the Foundation operates autonomously while being supported by the state and a network of public and private partners. This institutional support ensures its ability to act in the general interest and for national cohesion by transmitting history through the prism of

culture and civic education. The project is based on the idea that a shared and conscious memory can help forge a more critical, inclusive and responsible citizenry, capable of transforming historical injustices into opportunities for a more equitable future.

The analysis of two French ports, Nantes and Bordeaux, and their commemorative initiatives highlights how the recovery of the historical memory of slavery represents a complex and layered process. While Nantes has been able to use public history to promote an inclusive dialogue and turn its past into a tool for critical reflection, Bordeaux stands out for its path of recognition that, through the "Itinerary of Memory," aims to educate the public and contextualize its colonial heritage in a contemporary key. In both cases, the memory of slavery emerges as a key element in understanding the dynamics of social justice and identity that continue to influence the present.

This in-depth study demonstrates how public history, through critical analysis of ports and commemorative initiatives, offers valuable insights for multidimensional and articulate reflection on the past and its implications for the future.

It is also necessary to remember that, from primary to secondary school, teaching, particularly in the areas of history and geography, is a key tool for students to gain a thorough understanding of slavery. By supplementing traditional lessons with educational activities, participation in commemorative events and visits to memorial sites, students have the opportunity to develop civic reflection based on respect for human dignity and awareness of crimes against humanity.

Since the 1980s, in France and other countries marked by the history of the triangular trade, the memory of slavery has become increasingly prominent in the public arena. This renewed interest led, in the early 2000s, the French state to officially recognize the slave trade and slavery as crimes against humanity, thus expanding the scope of historical memory. This recognition meant that, in the years that followed, the study and teaching of these events found their place.

In addition to its memorial and historical research function, the treatment of slavery in schools today is an important topic for citizen reflection, capable of being addressed in an interdisciplinary way. In this way, education not only conveys knowledge of a painful chapter in history, but also stimulates critical and inclusive dialogue, promoting fundamental values such as justice, respect and equality.

Nantes, memory and public history: a city at the crossroads of past and present

Today, Nantes is often cited among the most innovative European cities, rewarded for its quality of life, cultural ferment and urban sustainability. However, behind this forward-looking image lies a history marked by pain, silence and estrangement: that of the Atlantic slave trade, of which Nantes was an undisputed protagonist between the 17th and 19th centuries. With more than 1,700 slave shipments, the city was the first French port involved in the triangular trade, which linked Europe, Africa and the Americas in an economic system based on the commodification of human beings.

For a long time, this dark page was removed from the city's public narrative, relegated to specialized knowledge or minority family memories. The turning point came in 1992, when Jean-Marc Ayrault, then mayor of Nantes, authorized the organization of a public exhibition dedicated to trafficking and slavery. The great success of the event-which attracted more than 400,000 visitors-marked a point of no return: slavery finally entered the public space, generating a national debate that culminated in 2001 with the approval of the *Loi Taubira*, the first law in the world to recognize the slave trade as a crime against humanity.

As Michel-Rolph Trouillot points out in his celebrated *Silencing the Past* (1995), the power of the history teller is also the power to choose what to remember and what to forget. In this sense, public history has the crucial task of restoring visibility to the "unspoken" of official memory. In Nantes, this dynamic took shape with the Memorial for the Abolition of Slavery (2012), a space that not only commemorates victims, but also educates and provokes reflection, through an immersive journey that combines historical data, art installations and literary texts.

The creation of this memorial is the result of a long dialogue between institutions, historians, activists and citizens, in line with a participatory and democratic conception of public history. But the memorial is also a contested site: repeatedly vandalized, it has become a symbol of unresolved tensions related to race, citizenship and colonial memory. The city's growing ethnic pluralism - evidenced by the steady increase of new immigrants, particularly from former French colonies - has contributed to an even more urgent need for a critical confrontation with the past.

The Mémoire de l'Outre-mer association, formed by descendants of slaves, plays a key role in this process, emphasizing the importance of decolonizing historical thought. As Françoise Vergès, a feminist and postcolonial theorist, argues, the decolonization of memory is not simply a reparative act, but a radical

rethinking of the way European societies construct their collective identities, too often based on the removal of colonial violence.

Bordeaux and Aquitaine: between shadows and lights

Bordeaux and the Aquitaine region have had deep relations with the African continent for centuries, marked by a double legacy: on the one hand, the painful memory of the slave trade; on the other, a lively cultural, academic and solidarity activity that testifies to a commitment to intercultural dialogue. Today, Africa occupies a central role in the socio-cultural fabric of the region, whose historical, economic and human ties with the African continent are being renewed in increasingly articulated forms.

The Institut des Afriques is an emblematic example of this: it promotes events, conferences, study days, exhibitions and art projects; it fosters cooperation between academic, cultural, associative and artistic realities; and it enhances on a national and international scale the specificity of the relationship between Aquitaine and Africa, from an innovative and inclusive perspective. These activities integrate historical memory and cultural development, transforming the past into a common heritage, a foundation for conscious citizenship.

Since 1989, MIGRATIONS CULTURELLES aquitaine afriques (MC2a) has been committed to giving visibility to African artistic expressions in the region, in partnership with universities, museums, art centers and local institutions. Co-founder of the Institut des Afriques, MC2a works in the fields of performing arts, education and event organization. Since 2016 he has been active in the Grand-Parc neighborhood of Bordeaux, where he promotes workshops, artistic residencies and initiatives aimed at schools and citizens, contributing to urban regeneration with a participatory and civic approach.

Founded in 2007, Rahmi - Network of Actors of Immigration History and Memory works for the enhancement of immigration history and overcoming prejudice, in close connection with the National Museum of Immigration History and other national collectives. Bringing together public, private and third sector actors, Rahmi promotes collective reflection on identity and social cohesion.

The NGO A la Source, active since 2015, addresses historical and memorial issues related to trafficking and slavery by promoting cultural events that restore humanity to a tragic history through exhibitions, theater, concerts, digital art, and fashion. Its approach is based on popular education for shared memory, building bridges between Europe, Africa and the Americas.

The May 10 Collective is dedicated to commemorating the struggles against slavery, while Kalina' Go disseminates the arts of French overseas cultures with a multidisciplinary and community-based approach. The Les Anneaux de la

Mémoire association works locally and internationally on cultural projects dedicated to the memory and legacies of the slave trade.

At the institutional level, the Foundation for the Memory of Slavery aims to integrate the history of slavery into France's official narrative, promoting social justice and the fight against racism through civic and cultural education. Recognized by the state and supported by public and private partners, the Foundation acts for a shared and responsible memory, in the perspective outlined by Paul Ricoeur of a memory as a "duty of justice."

The comparative analysis between Bordeaux and Nantes shows different but complementary approaches to public history. Nantes has been able to employ the memory of slavery as a tool for public dialogue and critical reflection, while Bordeaux has taken a more recent but significant path through the "Itinerary of Memory" and other initiatives aimed at contextualizing its colonial past. Both cities demonstrate how memory can be an active resource for understanding current dynamics of justice and identity.

A crucial role is played by schools: from primary to secondary, teaching history and geography enables students to gain a thorough understanding of the reality of slavery. Integrating lessons with educational activities, commemorative events and visits to memorial sites helps develop critical thinking based on respect for human rights. Since the official recognition in the early 2000s of slavery as a crime against humanity by the French state, the teaching of this topic has found its way into school curricula, contributing to widespread awareness.

However, alongside cultural and memorial initiatives, social problems related to immigration persist. According to Médecins du Monde, many migrant workers in Bordeaux live in precarious conditions, with serious health consequences, often in slums subject to frequent evictions. In 2021, there were more than 1,700 people in these settlements, compared to 870 in 2016. The associations denounce inadequate management that offers no real alternatives, exacerbating social exclusion in a changing metropolis.

In conclusion, Bordeaux and Aquitaine represent a living laboratory of memorial, cultural and social practices that interweave colonial history with the challenges of the present. The memory of slavery is not only a duty, but an opportunity to rethink collective identity, stimulate civic participation and build a more inclusive society. Public history, in this context, becomes an essential tool to connect past and future through knowledge, dialogue and social transformation.

Public History 'from below' and 'from above'

From Nantes, where there was a "claim from below" in favor of activating a full recognition of the history of trafficking as part of the city's history, to Bourdeaux, which took an absolutely opposite path of memory.

On the eve of the Revolution, Bordeaux, France's main colonial port, alone monopolized nearly half of colonial trade, sending twice as many ships to the American islands as Nantes or Marseille. The "exclusive" regime prohibited the colonies from trading with foreign countries, which greatly benefited Bordeaux merchants. They mainly practiced direct trade with the West Indies, called the "trade of righteousness." This trade was much less risky than "circuitous" or triangular journeys based on the slave trade. Throughout the entire century, the Righteousness trade accounted for more than 95 percent of Bordeaux's colonial trade. Thus it was not so much the slave trade that enriched Bordeaux, but the trade in colonial goods produced by slaves. Bordeaux therefore lived more from slavery than from the slave trade itself. Most of Bordeaux's trade was with the large island of Santo Domingo, which was, by the end of the 18th century, five times more populous and produced seven times more than any other island in the French West Indies. Santo Domingo had privileged ties with Aquitaine, which had provided it with the largest number of migrants: many of the planters who owned slaves came from the region. The island then monopolized more than 75 percent of Bordeaux's colonial trade and attracted eight out of ten passengers.

The Bordeaux slave trade counted 480 recorded shipments between 1672 and 1837. At the origin of the deportation of 120,000-150,000 black people, it was practiced by nearly 180 Bordeaux shipowners, only a minority of whom organized more than a dozen shipments. The Gradis, Nairac, Couturier and Laffon de Ladebat houses were the most important. But most financed only between two and five expeditions. For both the slave trade and the vertical trade, several merchants joined together to take part in the cargo and thus share the risks and profits. It can be assumed that several thousand residents of Bordeaux participated directly or indirectly in this trade. The triangular trade practiced by the city remained highly fragmented until the mid-18th century. Between 1672 and 1740, that is, over a period of 68 years, Bordeaux residents armed only 24 slave trade ships, half of them after 1730. This trade, which developed very slowly, intensified from 1740: in three years, the Bordeaux people sent as many ships as they had sent in the previous 68 years. However, Bordeaux was still the 5th largest French port for slaves in 1743. It was especially after the American War of Independence (1783) that the Bordeaux slave trade experienced its strongest expansion, accounting for 12 percent of the colonial trade. French merchants were now facing competition from Americans in the colonial market. However, the islands' need for labor and the difficulties in supplying slaves on

the west coast of Africa led to a sharp increase in the selling price of slaves, which also encouraged Bordeaux merchants to intensify the slave trade, which was now more profitable than the traditional trade.

Bordeaux, port de la lune. It is with this slogan that the city presents itself to tourists from all over the world, and it is not for nothing that its logo is an embrace between four half moons. However, visitors find it difficult not only to distinguish this crescent moon shape, but also to imagine a port in what is now the river corniche. In fact, a wide, long quay, to be traversed on foot, bicycle or rollers, is home to a botanical garden and an artificial body of water reflecting the superb facades of nineteenth-century buildings, a UNESCO World Heritage Site. Old hangars have been converted into exhibition or recreational spaces, and the rare ships that can be seen plying the waters of the Garonne are cruise ships with illuminated decks and dancing silhouettes, waving flags of distant countries. Yet in the 18th century, this port, just 60 kilometers from the ocean, was at the center of a fervent, hardly "clean" trade that was the source of the city's wealth.

But evoking the moon is surely more romantic than remembering the shame of one's past. And so it took a full two centuries before Bordeaux, the nation's second largest slave port after Nantes, did justice to the memory and to the mestizo population heir to that past. At the initiative of the municipality, but especially under the impetus of numerous associations fighting for the recognition of "diversity," a permanent exhibition entitled: Bordeaux au XVIIIe siècle: le commerce atlantique et l'esclavage (Bordeaux in the 18th century: the Atlantic trade and esclavage) was opened at the Musée d'Aquitaine to mark the national day of commemoration of the abolition of slavery and the black slave trade. Eight hundred square meters, four rooms: an itinerary that through engravings, objects, documents, audio and video installations, accompanies the visitor on a path of reparation that for some smacks of redemption, for others of catharsis. But which is intended above all to be a collective invitation to "take conscience." The msostra reconstructs the events that, on the eve of the revolution: Bordeaux was the leading port in terms of volume of trade with the islands of America. Benefiting from the "exclusivity" regime, which prevented the colonies from trading with foreign countries, it transported passengers and goods (cloth, flour, wine) from Aquitaine to the West Indies, which were exchanged for colonial products (sugar, tobacco, coffee, indigo, cocoa) to be redistributed in Europe. The need for labor in the West Indies pushed Bordeaux shipowners into the triangular trade in blacks: between 1729 and 1792, French ships deported about one hundred and fifty thousand blacks from West Africa to the West Indies. Abrogated by the Constituent Assembly in 1794 and reestablished by Napoleon Bonaparte in 1802, slavery was finally abolished in France in 1848.

The historical facts narrated in the exhibition are immersed in a setting that changes color from time to time: dark red in the first room, to celebrate the prosperity of the vine; brown in the second, to recall cane sugar, the real oil of the time; turquoise in the third to evoke the sea, the crossing, the elsewhere. Black and white, finally, for the last room. A checkerboard of photos and quotations symbolizing struggle, encounter, métissage. One resident of Bordeaux, originally from Guadeloupe, wrote: "We also sowed to invent the path, to liberate the past and the future. Our drums joined the lands and from this union was born the music of the New World."

This little poem reminds us that the slave, deprived of all human dignity, represented physical strength in the eyes of his master, who could not see beyond his muscles. Of this invisibility the slave made the pivot of his resistance. For while it is easy to destroy a man's body, it is more difficult, even depriving him of all dignity, to destroy his soul. Thus, the expression of one's interiority and culture-in all its forms and arts-that transcends the body became the true means of black emancipation. Even today, it is what we fail to see beyond skin color that makes the foreigner a "different" and thus a "slave" to arrogance. The chains of xenophobia and racism, of power and profit, imprison in the form of laws or barbaric acts the new slaves

Bordeaux, Haiti, and the intersecting memories of slavery

Bordeaux was one of the most significant trafficking realities, but a fundamental fact present-not always discreetly-in the city today is still little investigated: that of the enfranchised community, composed of black and mestizo men and women freed from slavery, often from the colonies. This community was well organized and concentrated mainly in the Saint-Seurin neighborhood, where networks of solidarity and forms of collective life developed. However, the temporary abolition of slavery between 1794 and 1802, followed by its restoration under Napoleon, led to a gradual thinning of the enfranchised presence. Some returned to the colonies, others assimilated into local society; By 1830, only about 30 remained in the city. Their visible disappearance from urban space became the symbol of a memory that, for a long time, Bordeaux repressed.

It is only in recent decades that the city has begun a journey of acknowledging its slavery past. An important signal was the establishment of the "Route Mémoirelle," an urban itinerary that includes memorial plaques, historical toponymy, and the statue of Modeste Testas, an enslaved African woman purchased by Bordeaux merchants. Whose remains are now symbolically returned to the city, and her figure has become an emblem of a recovered memory. Since 2019, the route has been enriched with new plaques that tell the biographies of people directly involved in the slave trade, such as David Gradis, a powerful Bordeaux shipowner, emphasizing their roles and responsibilities.

This approach, based on historical contextualization, aims not at erasure but at critical education, offering tools to reflect on the links between wealth, colonialism and racism.

Unlike other contexts-such as the United States or the United Kingdom-where statues of slavery-related figures were torn down or vandalized in protest, Bordeaux chose a more reflective path: rather than remove, it opted to contextualize, creating a public space capable of stimulating a confrontation with the past.

This comparison is part of a broader discussion of exclavism in the Atlantic world, which includes a case in point: Haiti. The first black republic in history, born out of an antislavery revolution, offers an extraordinary - and in some ways tragic - example of how the memory of slavery is treated differently. Despite the radical nature of the Haitian revolution (1791-1804), which led to the end of slavery and independence, the country has not developed a solid memorial infrastructure: there is a lack of large national museums or memorials dedicated to trafficking or slavery, with the exception of the Musée du Panthéon National Haïtien (MUPANAH), founded in 1983 in Port-au-Prince. This museum displays torture objects, chains, and memorabilia of the leaders of the revolution, but its resources are limited, as is its symbolic impact internationally.

The reasons for this apparent commemorative absence are complex. Partly weighed by the country's chronic economic difficulties, partly a political choice: many Haitian leaders have avoided insisting on a narrative that could be perceived as painful or humiliating to new generations, fostering national pride and post-revolutionary resilience. However, this reticence has made it more difficult to institutionalize the memory of slavery as a shared identity foundation.

The relationship with France, a former colonial power, remains central in this context. After independence, Haiti was forced in 1825 to pay a hefty "indemnity" to former French colonists as a condition for obtaining recognition of its sovereignty. An astronomical sum for the time: 150 million gold francs, later reduced to 90, paid in installments until 1883. A substantial part of these resources - about 2 million francs - ended up in the coffers of the French state, official documents reveal. Even as late as 1911, 84 percent of Haitian coffee tax revenue was devoted to servicing this debt, which helped strangle the young state economically, depriving it of the basis for autonomous development.

Today, this historical node is at the center of a debate on reparations and global historical justice. The French Foreign Ministry has acknowledged ties with Haiti and declared the need to address this legacy, but the calculation of France's actual achievements remains left to the work of historians. Meanwhile, Bordeaux has installed a plaque and bust of Toussaint Louverture, the iconic leader of the

Haitian revolution, acknowledging-though belatedly-the link between his figure and the city.

Louverture himself represents a crossroads of memories. After conquering most of the island of Hispaniola and reaching an agreement with Napoleon in 1800, he attempted to extend the abolition of slavery to the eastern part (today's Dominican Republic), where the institution of slavery persisted. His capture in 1802, deceptively orchestrated by French general Jean-Baptiste Brunet, and his death in captivity at Fort-de-Joux, in the glaciated foothills of the French Alps, marked a dramatic but not definitive moment. As Louverture himself prophesied before he was deported, "You have cut down the trunk of the tree of freedom, but it will sprout again, because its roots are deep."

And so it was. The following year, Jacques Dessalines proclaimed Haiti's independence on January 1, 1804. Today, in towns such as Cap-Haïtien, Ennery and Gonaïves, statues and monuments commemorate the protagonists of that revolution, including François Capois and Alexandre Pétion. These sites represent attempts-often local and discontinuous-to build a visible memory of resistance and emancipation.

However, the public narrative of the Haitian Revolution continues to be marginalized both internationally and within the black diaspora itself. The International Public History Association has questioned how to effectively represent the first slave revolution in modern history: not only as an exceptional event, but as a starting point for rethinking the relationship between history, power and justice.

A broader tension thus emerges in the comparison between Bordeaux and Haiti: on the one hand, the slow European process of recognizing complicity in slavery; on the other, the difficult post-colonial journey of those who overthrew that slavery. Asymmetrical memories, which today ask to be rearticulated into a shared horizon capable of connecting past and present, North and South, citizenship and reparation.

Guadeloupe: the limits of memoir and the power of identity in the making.

Guadeloupe, like many other Caribbean islands marked by Atlantic trade, experienced slavery for more than two centuries, until its final abolition in 1848 thanks to the efforts of Victor Schoelcher, a French politician and intellectual who was one of the main promoters of the emancipation of slaves in colonial territories. Today, the island preserves the memory of that past through the Mémorial ACTe, an emblematic monument located in Pointe-à-Pitre, built on the site of the former Darboussier sugar mill. Inaugurated on May 10, 2015, the Mémorial ACTe was promoted by the "International Committee of Colored

People" and built under the auspices of the Guadeloupe region. Its goal is twofold: on the one hand, to preserve and transmit the memory of trafficking and slavery; on the other, to offer a space for reflection and dialogue on the contemporary legacies of that past.

In recent years, in both Guadeloupe and Nantes, memorials have evolved by updating their narratives in light of regional, historical, and community specificities. In Nantes, a mercantile cosmopolitanism is celebrated to mitigate the memory of trafficking, while in Guadeloupe a narrative based on Afro-Antillean Creole and resilience is promoted. However, in both cases, official narratives remain firmly in the hands of elected representatives and institutional actors, who make them political and symbolic tools. These commemorative vulgates often serve as a counterweight to the critical voices of militant movements, art collectives, and associations that claim a more radical and decolonial reading of memory.

In the analysis that follows, the case of Guadeloupe will be explored as a central example, while that of Nantes will serve as a comparative mirror, useful for understanding how memorial devices reflect different political strategies and identity tensions within the French post-colonial space.

The title of this article was inspired by reading Marcus Wood's work, *The Horrible Gift of Freedom: Atlantic slavery and the representation of emancipation* (2000). In this book, Wood hypothesizes the existence of a historical continuity between the 'gift' of freedom granted by former colonial powers to enslaved populations, and the recent official commemorations of this gesture by the states that are its heirs. The work, while rigorously analyzing a wide range of historical, museographic, literary, and artistic references, builds a picture that highlights the persistence of a symbolic relationship of domination, albeit transformed over the centuries.

This approach - radically antagonistic to official narratives - raises fundamental questions, but at times risks adopting a reductive logic, unable to account for the complexity that characterizes the field of commemoration today. I do not fully share Wood's view that institutionalizing commemorations of slavery would perpetuate power relations between those who, yesterday as today, hold the power to grant (and now celebrate) freedom and those who can only accept it. This hypothesis neglects, in my view, the evolution of the entities involved and the overlapping of identities that characterizes contemporary postcolonial societies. As Paul Ricoeur (2000) points out, memory is never neutral: it is a selective act, shaped by present needs, and any commemoration implies an inevitable dose of forgetting. In this framework, today's memories do not reproduce an immutable dichotomy between the descendants of slaveholders

and slaves, but express a continuous and sometimes conflicting negotiation of the past.

The speeches and acts produced during ceremonies commemorating the abolition of slavery by the British (Munroe, 2016; Wood, 2000) and French (Hourcade, 2014; 2015) tend to privilege an abolitionist narrative focused on the civilizing action of the state, rather than the struggles waged by slaves. This orientation reflects what Michel-Rolph Trouillot (1995) called epistemic violence: a process through which certain voices are silenced or rendered inaudible in the construction of the dominant historical narrative. In response, counter-discourses emerge that, in search of legitimacy, clash with an institutional hegemony that manifests itself through what Dominique Larcher (2014: 330) has called a "genealogical schema": a mode of narrative that roots national identity in a selectively rewritten past.

The situations of Guadeloupe and Nantes, analyzed in this article, represent two emblematic examples of the contemporary construction of the memory of the Atlantic route, in which these power relations are expressed and clashed. However, as Pierre Nora (1984) has noted, *lieux de mémoire*-those places deputed to the preservation of the past-are not simply repositories of history, but instruments of identity construction and sometimes political normalization. As such, they can consolidate a pacified version of history and become spaces of symbolic conflict.

In the heart of Guadeloupe, the ACTe Memorial is proposed as a "citadel of memory," built on the symbolic and material ruins of a former *usine sucrière*-the physical site of slavery and, at the same time, of its post-abolitionist metamorphosis. This architectural choice is far from neutral: to erect a museum of slavery in a former sugar mill is to inscribe the memorial's narrative in a historical-economic continuity, even if the museum expedient tends to defuse the conflicting implications of this genealogy. The memorial, with its black, metallic structure emerging as a foreign object in the Caribbean landscape, presents itself as a temple of reconciliation rather than conflict, of universalism rather than historical specificity. However, its very monumentality-the monumentality of trauma-risks eclipsing the plurality of local memories, favoring a rhetoric of harmonious and depoliticized "*créolité*," more in line with a French republican ideology of integration than with the living, fractured and often antagonistic memories of Afro-Caribbean communities. In this sense, as Marcus Wood has noted, the "gift of freedom" risks being horrific precisely because it is inscribed in a device that, under the guise of celebration, domesticates the past to make it compatible with the French national imaginary and the demands of memory tourism. The museum thus speaks a double language: on the one hand it affirms the necessity of memory, and on the other it institutionalizes its form, stiffening

it into a consensual narrative that leaves little room for contestation or unresolved mourning.

Officially celebrating what had long been silenced risked, in his view, distorting its meaning. In this sense, MACTe's commemorative operation clashed with what Bourdieu called "wise ignorance"-an embedded and sedimented knowledge that does not necessarily translate into discourse, but manifests itself in gestures, silences and reticence.

More generally, among many guadalupese - from very different social backgrounds - the relationship with slavery's past is often mediated by a grammar of the unspoken: discretion, omission, allusion. Not out of a lack of memory, but out of a sense of modesty or protection. Intimate visions of this past are at once known and unacknowledged, hidden and shared, and struggle to meet the ceremonial and rhetorical framework of official memory. Marie-José Jolivet has already highlighted this tension, noting how a social memory of the plantation and a search for a 'positive' historical memory, linked to heroic figures capable of redeeming the shame of subjugation with the aura of resistance, coexist in Antillean societies.

According to many of the intellectuals, artists, activists, and citizens sensitive to the issue of memory, MACTe has obvious shortcomings: it speaks little about white engagés, Indian workers, marronnage, and many other elements essential to local history. Most importantly, it sidesteps the fact that creolization, now celebrated as an expression of identity, is also the product and reflection of fractures that are still active and difficult to name in contemporary West Indies society.

MACTe, inscribed in the institutional genealogy of the abolitionist 'gift,' proposes a universalist memory that has little dialogue with those who instead seek intimate roots and belonging. In this context, local memorial practices such as those of the Lanmou Ba Yo Association assume a crucial role. Starting with the exhumation of 272 corpses of slaves found on the beach of Anse Marguerite in the late 1990s, the association initiated a commemorative rite that aims to reconstruct an interrupted filiation: an affective and symbolic link between the living and "them," the nameless ancestors.

Every May 27, at dawn, a ceremony is held at the Edgar-Clerc Museum-where the remains are kept-followed by a seven-kilometer "sacred march" to the site of discovery. Each participant carries a stone, symbolizing an ancestor. The bones, in the course of the ritual, become family relics. The walk ends with the throwing of flowers, the reading of the association's statutes and, depending on the participants, moments of trance and spiritual connection.

The association's president, Jean-Luc Romana, interprets this ritual as a symbolic response to Father Jean-Baptiste Labat (1663-1738), a French Dominican missionary known for his writings on the West Indies and for his involvement in the slave system of the time - "seven days to make a slave" - through the number seven, the figure of resistance and redemption (the seven poles, the seven rhythms of GWO ka, the traditional music). Romana emphasizes that Lanmou Ba Yo does not oppose MACTe, but challenges its symbolic distance: "We don't honor the Republic, we honor our parents." He concludes, "For us it is unthinkable that the bones of our ancestors remain in a museum. We want a memorial ossuary, a protected place where they can rest and we, their descendants, regain a sense of belonging."

Memorials and official narrative: between memory and reconciliation.

When the idea of creating a memorial was floated in 1998, two competing proposals were compared: on the one hand, the creation of a museum and documentation center on human trafficking; on the other hand, a place of recollection, with a strong ethical and 'compassionate' value, modeled on the great memorials of the Shoah or the Vietnam War. This second option eventually prevailed, supported by the municipal authorities, but not without provoking political rifts and public controversy.

During the official ceremonies commemorating the abolition of slavery, it was preferred to insist on the supposed 'courage' of the city that would confront its 'shameful' memory with virtue and maturity, rather than evoking the French state's complicity in the slave system or the slave-led uprisings. The omission of these key elements contributed to the construction of a narrative focused on reconciliation and atoning repentance, rather than on a critical confrontation with history.

In Nantes, after decades of silence, the adoption of monumental and touristic language around the slave trade represents a paradigmatic example of what has been called a "reversal of stigma"-a process that aims to transform a traumatic past into cultural asset and symbolic capital (Ciarcia, 2016).

In recent years, both in Nantes and Guadeloupe, memorials have updated-each according to their own historical, regional and community specificities-celebratory narratives that tend to enhance their respective origins: the mercantile cosmopolitanism of Nantes on the one hand, the creoleness of the West Indies on the other. However, these commemorative vulgates, supported and promoted by local elected officials, occupy the center of symbolic and political space, serving as discursive devices of institutional legitimization and containment of alternative instances. They tend, in fact, to marginalize dissonant voices from militant

movements and civic associations that propose different, more confrontational and less pacified readings of the slavery past.

In this case, it is the case of Guadeloupe that forms the core of the analysis. The situation in Nantes, on the other hand, will serve as a term of comparison, a useful mirror to capture similarities and divergences, and one that could be the subject of further investigation.

Despite the richness of the exhibition and the universalistic ambition that runs through it, MACTe raises crucial questions about the risk of an aestheticizing musealization of trauma, that is, the transformation of the slave past into an object of aesthetic contemplation, pacified, depoliticized and 'consumable' in a harmonizing narrative framework. The choice to entrust the mediation of historical pain to immersive devices - set designs, sound effects, art installations - tends to construct a predominantly emotional and symbolic experience, where the visitor's compassion is often channeled within an affective regime that privileges personal catharsis over the collective and critical elaboration of memory.

As Marcus Wood observes, many contemporary commemorative institutions fall into a logic of 'museographic redemption' that promotes a universalizing and conciliatory view of the history of slavery, turning violence into an abstract human drama, 'reconciled' in the present. This expedient can operate a real hollowing out of the conflict, obscuring the still active colonial and racial continuities in favor of a reassuring humanitarian message. Similarly, authors such as Saidiya Hartman and Michael Rothberg have warned against the risks of "innocent implication," that is, the tendency to empathize with the pain of the past without questioning one's historical and social position in the present.

The MACTe thus finds itself oscillating between different vocations-museum, memorial, cultural center-without resolving the resulting tensions. The architectural monumentality of the site, its status as a "major public work" supported by local authorities and the French state, and its ambition to become part of the international circuit of memory tourism, conflict with the expectations of many local actors for a place of spiritual recollection, symbolic struggle, and reworking of Creole identity.

This institutionalized, standardized and spectacularized memory is countered by alternative forms of commemoration, such as those promoted by militant and spiritual groups in Guadeloupe, notably Lanmou Ba Yo, which organizes commemorative rituals, night ceremonies, processions by the sea, ritual walks and moments of ancestor evocation. These practices, often rooted in Afro-Creole spirituality, eschew Western narrative codes of the museum and reject the archival and classificatory logic of musealization, proposing instead a corporeal,

embodied, performative memory, where the past is not an object but a presence, a relationship, a voice.

This tension between living memory and monumentalized memory, between participatory commemoration and official narrative, also recalls Paul Ricoeur's reflections on "impure" memory, always exposed to selection, manipulation and forgetting, and Pierre Nora's on the "fracture" between memory and history in the contexts of patrimonialisation. As Achille Mbembe has observed, it is precisely in the management of the memory of the dead that power relations in post-colonial worlds are played out: deciding who has the right to be remembered, how and where, is an eminently political act.

Memorials and official narrative: between memory and reconciliation.

In the case of MACTe, then, rather than a strict dichotomy between 'success' and 'failure,' we are faced with a zone of symbolic tension in which the memory of slavery is continually negotiated, contested, and reinterpreted-both in the halls of the memorial and in the ritual, urban, and community spaces that challenge its discursive authority.

In his article "Le Mémorial ACTe: 'Quai Branly of Guadeloupe, Louvre of the Antilles-Guyana, Gorée of the Americas!'", Jean Moomou outlined the problematic genesis (and perhaps future) of this site [Moomou, 2015]. By tracing the history of political and symbolic issues related to the past of slavery, colonization, and the creation of the department of Guadeloupe, through the representations in public spaces of various figures of resistance to slavery and colonization who became heroic, Moomou questions the recent history of an architectural and monumental landscape that began to take shape since the 1990s. According to many critics, this building arises from the association of an uplifting doctrine, which aims to be universalist, and various registers of memory, which mix different historical and identity references.

Antagonistic memories and symbolic tensions

The economic and political regimes that enabled transatlantic trade are implicitly presented as the historical basis for the development of so-called Creole cultures. Thus, for example, artistic representations of deportation and violence on plantations are followed by symbolic figures of diasporic worlds, abolitionist movements, and resistance to slavery and colonialism. The final space of the overview, devoted to contemporary legacies, highlights both positive aspects (artistic creations and the contamination of contaminations) and negative aspects (alienations, new economic forms of exploitation).

Many interlocutors from the West Indies of Guadeloupe were outraged at the importance given to Freemasonry in the West Indies in the 18th and 19th

centuries in the space reserved for the abolitionist process. Others refused to set foot in the MACTe because they had heard of a passageway where visitors walked over images of slave bodies.

Despite the integration of different levels of analysis and reading (community, national, and international), MACTe fails to overcome the indifference of a part of the local population that sees no interest in retracing its history throughve2018so such a museographic and artistic device. The memorial is perceived as foreign, the bearer of a moral point of view, sensitive to political and aesthetic uses, which does not necessarily coincide with the widespread narratives and silences shared by the majority of the island's inhabitants.

What the people of Guadalupe asked for above all is that the bones be returned in a first phase, and then, in the new cemetery that the city of Le Moule is building, that we could create a memorial ossuary where our parents would be buried and where there would be a cultural work created to symbolize their presence, Not necessarily here, because we don't have control, because we have a problem with the sea, because we want to protect them. It would have been the first memorial charnel house in the African-American space. There was one in New York, the African Burial Ground, but what "we want to do is bring our parents back to our cemetery, to the heart of our cemetery today, so that people don't forget."

An emblematic example of this vision is found in the stele located on an embankment overlooking the Route des Mamelles in Basse-Terre. Here, during commemorative ceremonies, the presence of members of the Mouvement International pour les Réparations and independence groups clearly signals the political and reparative dimension of this Marron cult. In May 2018, a ceremony was held in which public speeches established a direct thread between the Marron resistance, the 1802 uprisings led by Louis Delgrès and Joseph Ignace against the restoration of slavery ordered by Napoleon, and Guadeloupe's still-living desire for independence.

One of the most significant events of the day was the night march organized by Guadeloupe National Park in collaboration with the cultural collective Vokoum. In an atmosphere charged with symbolic intensity, numerous participants-residents, activists, tourists-followed a long route through the forest in the footsteps of the Nèg Marrons. The route was punctuated by narrative and theatrical stages, in which the living conditions, survival strategies and epic feats of those men and women who rejected slavery to choose clandestine freedom were evoked.

During the tour, guide David Nazaire wove a speech full of historical and political references, emphasizing the similarities between the figure of Marron

and the militants of Guadeloupe's independence movement active in the 1980s. At one of the stages, he said, "Remember that between 1982 and 1985 many bombs exploded in Guadeloupe. The guys were not only setting off bombs just about everywhere on the island, but they were also forced to hide because they were being hunted by the police. There was a lot of talk at the time about who had 'gone marronnage'..."

In this narrative, marronnage is not only a practice of escape from the slave system, but also a form of contemporary resistance, a political strategy, a revolutionary genealogy that spans time and is renewed in the island's recent history.

David Nazaire also drew symbolic correspondences between the Marrons and the heroes of the 1802 revolt, thus consolidating an alternative pantheon of ancestor-warriors, capable of nurturing a memory of freedom that cannot be pacified or neutralized. In this perspective, the memory of slavery is not only a trauma to be sublimated, but also a source of pride, action and transformation.

In other contexts in Guadeloupe, different emotional registers emerge that revolve around the actualization of the figure of the Nèg Marron. In these valorizations of the marronnage, at the center of the commemorations is not so much a filial relationship with the victims of the slave system as a militant continuity on the themes of revolt, independence, and freedom. The Nèg Marron is thus elevated to the rank of civilizing hero, a figure emblematic of a history of active resistance and autonomous emancipation. The Nèg Marron have not yet really entered our history, although we have had exactly the same thing here, in Guadeloupe as in Brazil or Jamaica.

The cases discussed so far illustrate the presence of plural memorial sensibilities in Guadeloupe, which do not always coincide with the historical and cultural imaginary promoted by MACTe. These sensibilities may be mutually exclusive, but they may also coexist in the same individual. clear binary opposition between institutional and antagonistic.

Following these remarks, Peter Lema publicly read excerpts from the Charter of the Mandé (or "Charter of the Mandingo"), a 13th-century text often invoked as a precursor to a precolonial African humanism. The choice of this reading, made within the museum space, is far from neutral: the passage "Every human life is a life [...]. Every wrong done to a life deserves reparation" takes on a dual function here, rhetorical and political. Rhetorical, in that it repositions Africa as a source of universal ethical values, overturning the colonial assumption of its moral inferiority. Political, because it grounds on an indigenous symbolic authority-pre-existing the trauma of trafficking-the legitimacy of a demand for

restorative justice, no longer dependent on the granting of the memorial by French institutions.

In composing this discursive performance, Lema moves within an ambivalent semantic space, oscillating between the codes of established memory and those of active opposition. She employs symbols and figures belonging to the official vocabulary of recognition - such as the exhibition *Les Anneaux de la mémoire*, the words uttered by Angela Davis in the ceremonial setting, and the "beautiful texts" present in the memorial's display apparatus - but reinterprets them antagonistically, as tools for unmasking the aporias of the dominant commemorative discourse. In this sense, his gesture comes close to what Michel-Rolph Trouillot has described as a "historicity of absence": an attempt to reveal what is systematically excluded or evaded in the public construction of history.

The absence of the Code Noir in the museographic itinerary, for example, is thematized by him as a significant gap, an eloquent sign of what the hegemonic narrative prefers not to see. The Code Noir, the legislator and justifier of slavery in the French colonies, is symbolically absent here, and with it the legal-institutional aspect of colonial violence is also neutralized. The memoir thus seems to privilege the reassuring figure of the abolitionist-often white, often Republican-at the expense of the structural brutality of the slave system and the Afro-descendant resistance to it.

However, this critical stance is not without its tensions. At one point in a famous interview, Lema hesitates, aware that his personal genealogy does not directly connect him to the victims of the Atlantic trade. This hesitation highlights one of the most problematic knots in the politics of post-slavery memory: the very definition of "heir." Who has the right to speak, to remember, to seek redress? As Paul Ricoeur notes, memory is never pure recording, but always oriented interpretation. In this case, identification with the slave past is not so much a birthright as an ethical and political position. Lema appropriates a collective diasporic genealogy, but at the same time recognizes its porosity and limitations. Her discourse is symptomatic of a widespread tension in the contemporary field of Afro-descendant memory, in which post-slavery identity is constructed through a process of choice, solidarity and belonging, rather than through simple biological or national transmission.

Another voice disturbing the memorial consensus is that of Jean-Paul Ngassa, a former member of the *Les Anneaux de la mémoire* association. On May 10, 2016, at the official ceremony to commemorate the abolition of slavery, Ngassa took the floor, forcefully and passionately, to denounce the absence from the memorial of a central figure of black resistance: Toussaint Louverture. His request-already formalized through a petition to Mayor Jean-Marc Ayrault to name the esplanade of the Palace of Justice after Louverture-had gone unheeded.

"Where is Toussaint Louverture in all this?" he asked aloud. The question is less topographical than symbolic: Louverture, founder of the first black republic and a revolutionary figure, represents a paradigm of autonomous black action that eschews the humanitarian framework of abolition granted from above. His absence - significant and strategic - marks the boundaries of the narrative compatible with republican memory.

A city councilor's immediate response, "They are individuals who represent only themselves," served the function of reducing Ngassa's intervention, to the sphere of noise, excess, and political irrelevance. But it is precisely in these marginalized voices that the most acute symptoms of the tension between official and agonistic memory (to use Anna Cento Bull and Hans Lauge Hansen's term) are manifested. The latter does not aim to replace one hegemonic narrative with another, but to keep the conflict open, to acknowledge the irreducible plurality of viewpoints, and to bring out what is systematically silenced by the process of heritagiarization.

The case of Nantes, in this sense, does not mechanically re-propose the slave-"master" pair, but rather shows how contemporary forms of historical denial and selection manifest themselves precisely in the memorial politics that claim to recognize that past. The symbolic structure of commemoration, instead of pacifying, reveals and reactivates unhealed rifts, giving rise to forms of memorial marronnage: a symbolic, often poetic and performative escape from the normed spaces of memory.

Conclusions

In light of these dynamics, the controversies that have arisen around the presence of the memorial-rather than signaling a "misuse" of memory-express the intensity of the desire for recognition and symbolic justice that the memorial fails to contain. As Saidiya Hartman points out, the task of radical memory is not to restore a lost origin, but to articulate the pain of absence, and to do so in ways that challenge the official grammar of memory. In this sense, contemporary memorials, even when sincerely motivated, risk becoming ambiguous devices: spaces in which the traumatic event is celebrated without fully addressing its structural implications in the present.

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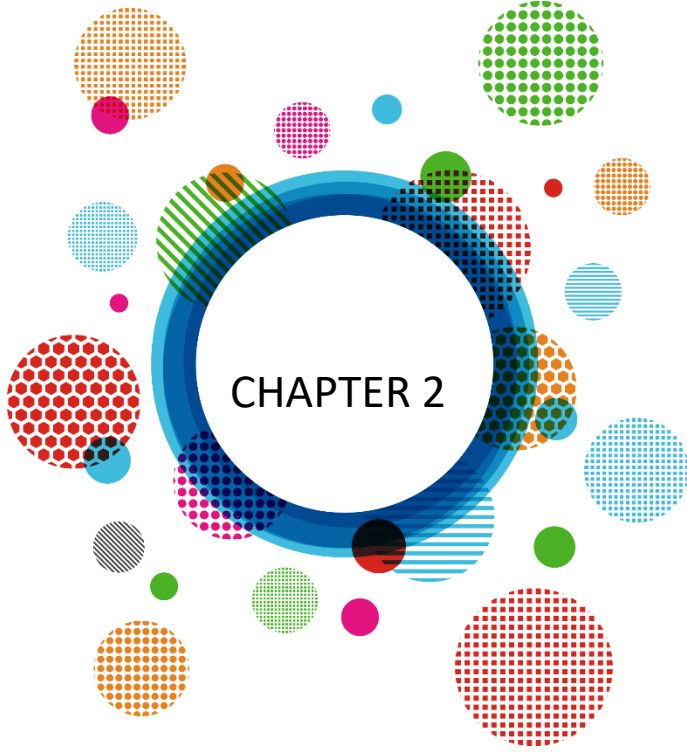
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Geospatial Interpretation of Subsurface Structures in Geoarchaeological Landscapes Using Electrical Resistivity

Fatih Sünbül¹

¹ Assoc. Prof. Dr., İzmir Bakırçay Üniversitesi, ORCID: 0000-0002-3590-374X

1. Introduction

Archaeology is a scientific discipline that seeks to understand past social structures and cultural processes through the material remains of human societies (Kristiansen, 2009). Until the mid-20th century, the field evolved primarily as a descriptive endeavor, largely focused on typological classifications. However, from the 1960s onward, the emergence of the “New Archaeology” movement—spearheaded by figures like Lewis Binford—shifted archaeology toward a more scientific and explanatory direction, emphasizing the importance of theory and method (Binford, 2017). This movement asserted that archaeology should not merely describe the past but should also serve as a social science capable of explaining the causes underlying cultural systems. Consequently, archaeological inquiry must involve hypothesis formulation, data collection, analysis, and the testing of empirically derived, falsifiable propositions (Stiner, 2013).

One of the key theoretical frameworks informing scientific explanation in archaeology is the “deductive-nomological model,” or “covering-law model,” developed by Carl G. Hempel and Paul Oppenheim in the philosophy of science. This model posits that a scientific explanation must consist of two essential components: a law-like generalization that encompasses the phenomenon and a set of initial conditions relevant to the context in which the phenomenon occurs. Together, these allow for the logical deduction of the event in question (Gervais and Weber, 2011). Such a framework not only explains why an event occurred in the past but also predicts its recurrence under similar conditions. Although its direct application in historical sciences like archaeology may be limited, this model provides a robust theoretical basis for interpreting recurring cultural patterns and human behaviors. Processes such as the emergence of subsistence strategies, transformations in settlement systems, or the diffusion of technological innovations under specific environmental or social conditions can be framed as generalizable patterns, aligning archaeological interpretation with scientific logic. It thus enables archaeologists not only to reconstruct unique historical scenarios but also to identify causal relationships and formulate predictive models grounded in recurring human–environment dynamics.

In recent decades, archaeological research that focuses on the reciprocal interactions between humans and their natural environments has gained significant momentum. This shift has fostered the emergence of a rich, interdisciplinary literature that is theoretically layered and methodologically diverse (Arponen et al., 2019). Within this context, new approaches have been developed to understand how ancient societies adapted to environmental challenges and interacted with the natural world (Kearns, 2017). Subfields such as environmental archaeology, human paleoecology, and conservation-oriented archaeology have become increasingly prominent (Reitz & Shackley, 2012).

Although these approaches differ in their data sources, methodological frameworks, and theoretical orientations, they all share the common objective of contextualizing human history within broader environmental dynamics.

2. The Discipline of Archaeology and Its Conceptual Foundations

From its origins, the discipline of archaeology has been closely intertwined with the natural sciences. In 18th and 19th century Europe, archaeology was often regarded as a subfield of the “natural sciences,” alongside geology and paleontology. Consequently, early archaeological investigations frequently focused on fundamental questions concerning the human presence on Earth. Through stratigraphic methods, researchers sought to establish chronological frameworks for human history by associating ancient faunal remains with archaeological artifacts. The effects of environmental changes on human life were among the central concerns of these early studies (South, 2002).

By the early 20th century, archaeology had begun to separate from anthropology, emerging as an independent academic discipline. During this transition, interpretations concerning human–environment relationships began to show notable regional variations. For instance, in Europe, environmental archaeology largely followed a methodological and descriptive trajectory (Mellars, 2006), whereas in North America, theoretical orientations and approaches rooted in cultural ecology gained prominence (Rouse, 1956).

2.1. Environmental Archaeology

Environmental archaeology is a sub-discipline that developed primarily in the United Kingdom, with a central focus on reconstructing past environmental conditions (paleoenvironments) through scientific methods. This approach relies heavily on biological and geological analyses, such as pollen analysis, microbial residues, soil sampling, and studies of faunal and floral remains, all of which contribute to a better understanding of the environmental context. Environmental archaeologists typically work in multidisciplinary teams that include specialists from subfields such as zooarchaeology, paleobotany, and geoarchaeology (Reitz & Shackley, 2012).



Figure 1. In 1986, Tim Schadla-Hall undertook excavations at Seamer Carr ahead of the site's planned use as a waste management facility in Scarborough (Adapted from *Return to Star Carr: Discovering the true size of a Mesolithic settlement*, by C. Catling, 2013, *Current Archaeology*, Issue 282. © Current Publishing Ltd. Used with permission).

One of the major turning points in this field was Grahame Clark's excavation at Star Carr, which is widely regarded as a landmark case (Farnell, 2010) (Figs. 1 and 2). The interdisciplinary methodology applied in this excavation highlighted the importance of environmental data in archaeological research and played a significant role in the institutionalization of environmental archaeology. However, from the 1980s onward, the field began to face criticism for its perceived theoretical shortcomings. Critics argued that its emphasis on data collection and descriptive analysis limited its research scope and contributed to a narrowing of the discipline's investigative agenda.



Figure 2. The trench originally excavated by Clark was reopened in 2010 to evaluate potential degradation in the preservation of organic materials since the 1950s. Notably, the same birch tree exposed during the initial excavation remains intact and visible, providing a direct point of comparison across six decades. *Image sources: Scarborough Archaeological & Historical Society; Vale of Pickering Research Trust (Adapted from Return to Star Carr: Discovering the true size of a Mesolithic settlement, by C. Catling, 2013, Current Archaeology, Issue 282. © Current Publishing Ltd. Used with permission.).*

2.2. Human Paleoecology

Human paleoecology is a theoretical approach that emerged primarily in North America, aiming to interpret how humans responded to environmental changes. Julian Steward argued that cultural differences are directly linked to environmental conditions and that archaeology must consider ecological contexts to better understand human behavior (Jones, 2008). This theoretical orientation later evolved by incorporating ecological theories such as optimal foraging theory and resilience theory. In particular, aspects of hunter-gatherer societies—such as resource use, settlement patterns, hunting strategies, and population dynamics—have been analyzed through models rooted in the ecology of human behavior. This framework advances a paradigm in which the relationship between humans and their environment is not unidirectional but reciprocal. It suggests that while the environment influences and shapes human behavior, humans also leave lasting impacts on their surroundings (Steiner, 2016).

During the Late Pleistocene, our ancestors demonstrated remarkable ecological flexibility in adapting to the highland savanna environments of mainland Southeast Asia (Fig. 3). Stable carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotope analyses of human and faunal tooth enamel from the Tham Lod Rockshelter in northwestern Thailand reveal a mixed reliance on C_3 and C_4 plant resources. These findings suggest that early hunter-gatherer populations inhabited mosaic environments at the forest–grassland ecotone, allowing for opportunistic foraging strategies across diverse habitats. Crucially, this study supports the hypothesis of a northward extension of a savanna corridor during the Last Glacial Maximum (LGM), which may have facilitated human dispersal across mountainous terrain. This ecological and behavioral pattern provides valuable insight into human paleoecology in upland Southeast Asia and challenges models that overemphasize rainforest specialization during the terminal Pleistocene (Suraprasit et al., 2021).

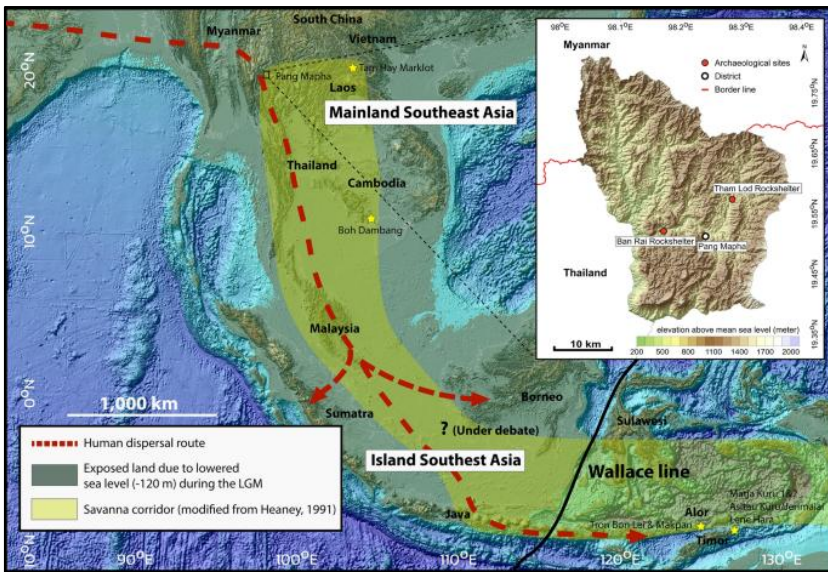


Figure 3. Hypothetical north–south savanna corridor and early *Homo sapiens* dispersal route across mainland Southeast Asia during the Last Glacial Maximum (LGM), with the location of key archaeological sites including Tham Lod Rockshelter. (Adapted from Suraprasit et al. (2021), *Scientific Reports*, 11, 16756. Licensed under CC BY 4.0.)

2.3. Integrating Archaeological Data into Biodiversity Studies

There is a growing recognition that archaeological data not only contribute to understanding the past, but can also inform present-day environmental policy. Particularly in discussions surrounding “Pleistocene extinctions,” the role of human activity in shaping biodiversity has become a focal point, positioning

archaeology at the intersection of ecology and conservation biology (Rick & Lockwood, 2013). This perspective prompts a reevaluation of past human practices such as landscape management, agricultural systems, species translocation, and the use of fire—not just in terms of their environmental impacts, but also their sustainability.

While archaeological literature often frames these effects as “degradation” or “depletion,” anthropological scholarship more frequently interprets them through lenses of “management” and “sustainability.” This divergence underscores the importance of terminological precision and highlights the necessity of interdisciplinary collaboration (Richard, 2012). Initially guided by broad, descriptive questions, archaeological research on human–environment interaction has evolved toward more focused, theoretically grounded, and solution-oriented approaches. Advances in quantitative methodologies and geophysical technologies have played a critical role in this transformation, significantly enhancing the resolution and reliability of environmental data.

The integration of geophysical survey methods—such as magnetometry, ground-penetrating radar (GPR), and electrical resistivity—into archaeological contexts has not only enabled non-invasive analysis of subsurface features, but also facilitated high-resolution reconstructions of past human–environment dynamics. As a result, archaeological data production is becoming more refined, comprehensive, and increasingly relevant to policy-making processes. This shift calls for archaeologists to be seen not merely as technical specialists, but as interdisciplinary researchers who can contribute to environmental planning and sustainability strategies. Importantly, this reorientation moves beyond merely documenting the “negative” environmental effects of past societies, and toward illuminating examples of adaptive, resilient, and sustainable human–environment relationships. In doing so, archaeology is transformed from a retrospective science into a strategic guide for contemporary environmental decision-making.

Building upon this interdisciplinary trajectory, recent developments in archaeological science have demonstrated that data derived from past human–environment interactions can serve as a strategic knowledge base for contemporary environmental decision-making. While archaeological research increasingly addresses the long-term ecological impacts of human activities—such as fire management, species translocation, and land use—its relevance has expanded beyond historical inquiry into active participation in biodiversity conservation and sustainability policy. This perspective prompts a reevaluation of past human practices not only in terms of environmental degradation but also as potential examples of resilience and adaptive land management.

This shift is echoed in broader scientific domains through transformative initiatives like the Global Biodiversity Information Facility (GBIF), which has

revolutionized biodiversity science via large-scale data integration. As shown by Heberling et al. (2021), GBIF has enabled novel global analyses by aggregating over 1.6 billion biodiversity occurrence records across taxonomic and spatial scales, fostering scientific collaboration and promoting data-driven approaches to conservation. These integrated datasets—merging observational and specimen-based data—have catalyzed new analytical capacities, particularly in species distribution modeling, macroecology, and disease ecology. Parallel to these developments, archaeological science has embraced geophysical survey methods such as magnetometry, ground-penetrating radar (GPR), and electrical resistivity, facilitating high-resolution, non-invasive reconstructions of past land-use and human–environment dynamics (Sünbül, 2007). The resulting data-driven frameworks not only refine our understanding of human history, but also elevate archaeology as a policy-relevant science aligned with sustainability goals. Together, archaeological and biodiversity data systems underscore the need for integrated, interdisciplinary knowledge infrastructures that can inform actionable environmental strategies for the Anthropocene and beyond.

3. The Concept of Geoarchaeology

Geoarchaeology is an inherently interdisciplinary field that integrates the methods of geography, geology, geophysics, and other earth sciences within the framework of archaeological inquiry. This discipline not only focuses on locating ancient structures but also analyzes the environmental conditions under which these structures were built, how they transformed over time, and how human settlements interacted with natural processes. The geoarchaeological approach employs a wide range of techniques—including geomorphology, soil morphology, sedimentology, geophysical measurement methods, and spatial analysis tools—to understand the relationship between buried, invisible remains and their surrounding environment.

In this context, the electrical resistivity method has become a vital tool in the geoarchaeological analysis of archaeological landscapes. This technique measures the differences in resistance caused by varying electrical conductivity of subsurface materials, thereby revealing the location and boundaries of buried structures without excavation. Features such as wall foundations, hearths, fired clay constructions, and refilled pits—due to their distinct electrical properties compared to the surrounding soil—can be effectively detected. As a result, it becomes possible to geographically distinguish between anthropogenic and natural formations.

Geoarchaeological investigations often require solutions that go beyond surface-level observations, due to the complex subsurface structures involved. Therefore, resistivity not only serves as a tool for subsurface detection but also

offers a broader interpretive framework for reading the archaeological landscape. When integrated with Digital Elevation Models (DEMs), Geographic Information Systems (GIS), and remote sensing technologies, this method significantly contributes to understanding the spatial organization of research areas and to the preliminary mapping of potential archaeological sites (Parcak, 2014).

This book chapter will thoroughly explore the role of electrical resistivity in geoarchaeological interpretation, discussing its theoretical foundations, field application procedures, electrode array configurations, and how it aids in the spatial mapping of archaeological features. By combining the analytical power of geographic thinking with the technical capacity of geophysical measurement, this method brings a novel interpretive perspective to geoarchaeology in understanding past human–environment relationships.

4. Fundamentals of the Archaeogeophysical Approach

Archaeogeophysics, also referred to as “archaeological prospection,” is based on detecting the physical contrasts created between buried archaeological structures and the surrounding soil (Wynn, 1986). Although these structures are not visible on the surface, they can be identified through the changes they cause in physical properties such as conductivity, magnetism, and density. When these variations are measured, the location and boundaries of the structures can be revealed with high accuracy. The success of such investigations largely depends on the degree of physical difference between the target structure and its natural surroundings. However, in the case of deeply buried features, signal attenuation poses a challenge for detection. Regardless of the method employed, highly sensitive systems are required to detect weak signals at greater depths. As depth increases, environmental interference and background noise also become more prominent, complicating the identification of smaller archaeological remains.

Since archaeological sites often have limited horizontal and vertical dimensions, investigations in these areas require data collection at very close intervals. Most archaeological targets are located at depths shallower than five meters—depths that often coincide with the noise range in standard ground sounding equipment. As a result, instruments and analysis software developed for deep geological exploration are not suitable for the detailed analysis of archaeological structures. Therefore, archaeogeophysical studies necessitate a specialized body of technical knowledge and methodological approach tailored to the unique demands of archaeological research (Batayneh, 2011).

4.1. Geophysical Methods Used in Archaeological Sites

4.1.1. Aerial and Remote Sensing Techniques

"Aerial archaeology" relies on analyzing surface-level anomalies—such as shadow marks, vegetation differences, or soil color changes—caused by buried archaeological structures, using images captured from aerial platforms. First adopted after World War I in the United Kingdom, this technique has shown particular efficacy in detecting remains from Roman times (Beazeley, 1919). In recent decades, the scope and precision of aerial archaeological methods have dramatically evolved with the introduction of advanced remote sensing technologies (Fig 4.). Today, aerial archaeology comprises a diverse suite of techniques, including aerial photography, LiDAR (Light Detection and Ranging), satellite imagery, and thermal imaging, each offering distinct advantages depending on the archaeological context.

- **Aerial Photography** remains a cornerstone technique, enabling detection of subtle features such as crop marks, soil discolouration, or shadow variations. These visual cues often correspond to buried walls, ditches, or roads and can be analyzed using multispectral or infrared cameras to enhance visibility of anomalies.
- **LiDAR** has revolutionized the field by providing the ability to generate high-resolution 3D topographic models that can penetrate dense vegetation. This capability makes it possible to detect previously unknown structures in forested or inaccessible areas. For instance, in Mesoamerica and the Amazon, LiDAR has uncovered vast ancient cityscapes hidden beneath jungle canopies.
- **Satellite Imagery**, including LANDSAT and commercial high-resolution platforms, is increasingly used for large-scale archaeological surveys. These images support the identification of regional site patterns, landscape use, and environmental changes over time.
- **Thermal Imaging** detects variations in ground temperature caused by subsurface features. Since buried structures often retain heat differently from the surrounding soil, thermal data can be used to identify hidden chambers, foundations, or voids.

These technological developments enable archaeologists to extend their analytical reach far beyond what is visible at the surface. Moreover, they facilitate more efficient site management, conservation planning, and public engagement through the creation of detailed 3D models and virtual reconstructions.

“Aerial archaeology has transformed the field of archaeology, allowing researchers to explore and interpret the past from a new perspective.”
(Archaeology News, 2022)

Such methods also align with the broader aims of geoarchaeology by contributing to non-invasive landscape-scale interpretation and enhancing interdisciplinary collaboration between archaeology, geography, and environmental sciences.



Figure 4. Aerial photograph courtesy of the Aerial Photographic Archive for Archaeology in the Middle East, via Archaeology News Online Magazine (2022).

4.1.2. Seismic Methods

Seismic methods measure how underground structures respond to sound waves, revealing properties such as density, hardness, and voids. In archaeology, they are primarily used to detect cavities in rocks or remnants of ancient walls. The seismic refraction method measures changes in wave velocity across increasingly deep layers. However, interpreting data can be challenging due to the heterogeneous and three-dimensional complexity of structures in archaeological contexts (e.g., burial chambers) (Aitken, 2014). Seismic reflection techniques are especially effective in mapping large anisotropic structures such as buried shipwrecks, voids, or geological faults. Recently, 3D seismic tomography has been used to detect migration routes and temporary settlements in habitation zones (Valenta & Dohnal, 2007).

4.1.3. Magnetic Methods

Magnetic methods enable the surface mapping of buried structures by detecting variations in magnetic properties. Fired clay, stone walls, and iron-rich remains exhibit higher magnetic susceptibility than surrounding soil. These differences can be detected with high precision using magnetometers. Magnetic methods are commonly employed to locate walls, cisterns, roads, and hearths. Additionally, archaeomagnetic dating can be used to estimate the use period of structures based on their thermal remanent magnetization (Tite & Mullins, 1971).

4.1.4. Electromagnetic (EM) Method

Electromagnetic systems generate an alternating current (AC) on the surface and measure the response from conductive underground structures. This method can assess surface conductivity and effectively detect refilled areas, metal-rich zones, or burial remains (Tabbagh, 1986). EM devices, especially the Slingram type, are effectively used in dry and hard terrains, including rocky areas. The high speed of data collection makes it suitable for surveying large areas.

4.1.5. Gravimetry

Gravimetric methods measure variations in underground density to produce anomaly maps. While small archaeological features generally create low-amplitude anomalies—limiting the method's success—gravimetry is highly effective for detecting buried chambers, voids, tumuli, and unexcavated graves. The application of gravimetry in archaeological sites often requires detailed elevation corrections and a dense measurement grid. Although time-consuming and costly, it serves as a valuable complementary tool for characterizing complex structures (Gorman, 2009).

4.1.6. Electrical Resistivity Method

This method is based on measuring the resistance of subsurface materials to electrical current. Conductivity differences in the soil are revealed through electrodes that introduce current into the ground. Features like water-filled pits, stone foundations, or brick structures exhibit distinct resistance values, making them detectable by this technique. Modern applications use 2D and 3D electrical tomography to generate detailed structural models. For instance, in the ancient settlement of Umm er-Rasas in Jordan, moisture-rich areas beneath structures were successfully visualized using this method (Leith, 1976).

5. Electrical Resistivity Method: Theoretical Background, Application Types, and Archaeological Interpretation

The electrical resistivity method is a powerful, non-invasive technique widely used in both engineering and archaeological geophysics to assess the physical

properties of subsurface structures. It is employed not only to detect buried archaeological features but also in identifying conductive subsurface layers, modeling natural hazards such as landslides, and conducting ground characterization studies. This method primarily includes two main applications. The first is Vertical Electrical Sounding (VES), which aims to determine resistivity variations with depth. Through this approach, it becomes possible to identify subsurface layer thicknesses, structural boundaries, and geological separations. The second is the Mapping (Profiling) Method, where the electrode spacing is kept constant to map lateral resistivity differences at a specific depth. This method is particularly effective in delineating the horizontal extent and boundaries of buried archaeological structures.

5.1. Physical Principles of Resistivity and Conductivity

Resistivity is the measure of a material's opposition to the flow of electric current and is typically expressed in ohm-meters ($\Omega \cdot m$). The resistance of a conductor is related to its length (L) and cross-sectional area (S). Resistivity, however, is independent of the geometric dimensions of the conductor and depends solely on the intrinsic properties of the material from which the conductor is made (Fig. 5) (Light et al., 2004). Accordingly:

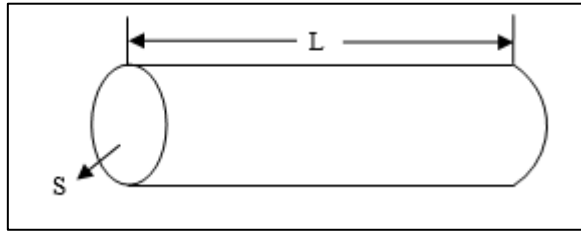


Figure 5. Conductive Cylinder. L: Length of the cylinder, S: Cross-sectional area of the cylinder.

Resistivity is the measure of a material's resistance to electric current and is typically expressed in ohm-meters ($\Omega \cdot m$). The resistance of a conductor is related to its length (L) and its cross-sectional area (S).

$$\rho = \frac{RS}{L} \quad (1)$$

This relationship reveals that electrical conduction depends not only on physical dimensions, but also on the chemical and mineralogical properties of the medium. Conductivity (σ) is the inverse of resistivity and is expressed in Siemens per meter

$$(S/m): \sigma = \frac{1}{\rho} \quad (2)$$

In natural environments, electrical conductivity can occur through three primary mechanisms. Electronic conductivity is facilitated by the movement of free electrons and is typically observed in metals. Electrolytic conductivity results from the movement of ions and is especially prevalent in porous and water-saturated materials. Lastly, dielectric conductivity arises in insulating media when subjected to alternating electric fields, enabling limited charge displacement within the material. These distinct mechanisms play a crucial role in interpreting subsurface properties during geophysical investigations. Porous rocks can exhibit high electrolytic conductivity depending on the ionic composition of the fluids they contain. This property serves as a significant parameter for distinguishing materials such as fired clay, stone, and rock used in archaeological contexts from surrounding environmental formations. While compact rocks show low electrical conductivity due to their high resistivity, conductivity in porous rocks largely depends on the electrolytic properties of the fluids filling the pores. The ions present in water-filled pores affect the rock's resistivity based on their concentration, mobility, and solubility. Therefore, the electrical conductivity of porous rocks can vary significantly according to the volume and distribution of pores, as well as the quantity and chemical characteristics of the fluids they contain.

5.2. Ohm's Law and Geophysical Interpretation

The fundamental physical basis of the electrical resistivity method is Ohm's Law (Antonov, 2016). When a constant direct current flows through a passive circuit element, the ratio between the voltage observed across the element and the current remains constant; this unchanging ratio is defined as electrical resistance.

$$R = \frac{\Delta V}{I} \quad (3)$$

This indicates that in a stable medium, the ratio of potential difference to current remains constant. If the medium is three-dimensional, homogeneous, and isotropic, the differential form of this condition can be expressed as follows:

$$E = \rho J \quad (4)$$

In this context, E represents the electric field, which describes the force per unit charge exerted by an electric potential. J stands for the current density, indicating the amount of electric current flowing per unit area. Lastly, ρ denotes the resistivity of the medium, a material property that quantifies how strongly the medium opposes the flow of electric current. Together, these parameters form the

foundational relationship for understanding electrical resistivity in geophysical applications.

5.3. Electrode Arrays and Geometric Factors

The resistivity method is implemented using various electrode array configurations, depending on how the current and potential electrodes are arranged. Each configuration influences the resolution, depth sensitivity, and horizontal discrimination of the acquired data differently. The basic electrode system consists of two current electrodes, labeled A and B, which are used to inject electrical current into the ground, and two potential electrodes, labeled M and N, which are used to measure the voltage difference generated by this injected current (Fig 6). In resistivity measurements, current is applied via the A and B electrodes, and the resulting potential difference is measured using the M and N electrodes. The layout of the electrode system is shown in Figure 2. When analyzing the relationship between the geometric factor (k) and resistivity (ρ), the potential at point M in an isotropic and semi-infinite medium is given by:

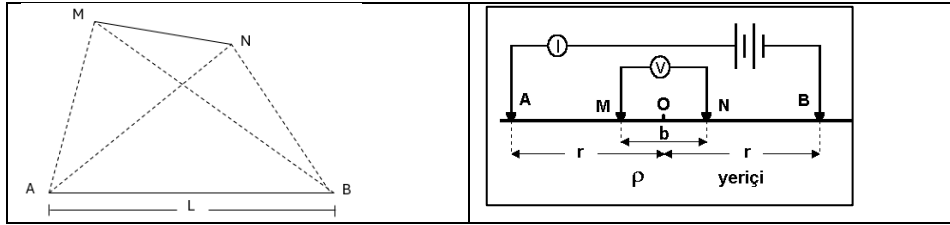


Figure 6. General representation of electrode configurations

$$V_M = \frac{I\rho}{2\pi} \left(\frac{1}{AM} - \frac{1}{BM} \right) \quad (5)$$

It will be as follows. Under the same conditions, the potential at point N is:

$$V_N = \frac{I\rho}{2\pi} \left(\frac{1}{AN} - \frac{1}{BN} \right) \quad (6)$$

is obtained. In practice, since the potential difference between points M and N is measured, the equation for the potential difference is derived using the expressions above.

$$V_M - V_N = \Delta V = \frac{I\rho}{2\pi} \left(\frac{1}{AM} - \frac{1}{BM} - \frac{1}{AN} + \frac{1}{BN} \right) \quad (7)$$

$$\left(\frac{1}{AM} - \frac{1}{BM} - \frac{1}{AN} + \frac{1}{BN} \right) = P \quad (8)$$

If the expression within the parentheses is accepted as such, then from the resistivity relation we obtain:

$$\rho = \frac{\Delta V}{I} k \quad (9)$$

By also utilizing the resistivity relation, the expression for apparent resistivity in the general representation can be written as:

$$\rho = \left(\frac{2\pi\Delta V}{I} \right) P \quad (10)$$

From this, the geometric factor (k) for a general electrode configuration can be expressed as:

$$k = 2\pi\rho \quad (11)$$

In this expression, the parameter P in Equation (2) represents the inverse of the term given in parentheses in Equation (8). The k term is the geometric factor corresponding to the electrode configuration (as shown in Fig. 6).

5.4. Commonly Used Electrode Arrays in Field Applications

5.4.1. Schlumberger Configuration

In this system, the current electrodes are placed at wide intervals, while the potential electrodes are positioned near the center. Since the potential electrodes remain fixed during measurements, the array is less sensitive to lateral heterogeneities (Zohdy, 1989). This characteristic makes the Schlumberger configuration ideal for deep and systematic surveys (Fig. 7).

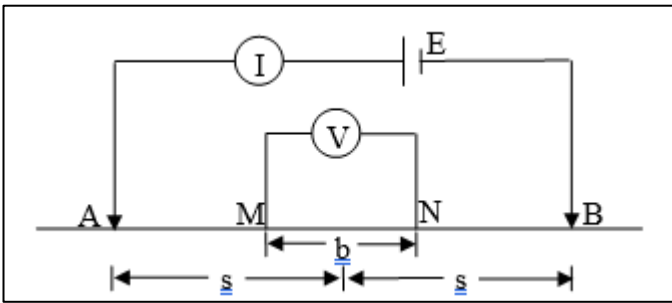


Figure 7. Schlumberger electrode configuration model

In the Schlumberger array, the spacing between the potential electrodes (MN) is significantly smaller than the spacing between the current electrodes (AB). The geometric factor for the Schlumberger electrode configuration can be derived as a specific application of Equation (11):

$$k = \pi \left(\frac{s^2}{b} - \frac{b}{4} \right) \quad (12)$$

is obtained in this form. Similarly, the apparent resistivity for the Schlumberger array is determined by substituting Equation (12) into Equation (9):

$$\rho_s = \pi \left(\frac{s^2}{b} - \frac{b}{4} \right) \frac{\Delta V}{I} \quad (13)$$

is obtained. In the Schlumberger electrode configuration, apparent resistivity values are typically plotted as a function of the half-spacing between the current electrodes, known as the AB/2 distance. Therefore, for the interpretation of measurement results, this AB/2 parameter is considered a fundamental reference. In vertical electrical sounding (VES) applications, the potential electrodes are kept stationary at a fixed location, while the current electrodes are symmetrically moved outward from the center of the measurement line. However, for reliable measurements, it is often not sufficient to extend only the current electrodes. To accurately and sensitively measure the potential difference, the potential electrodes also need to be extended to some extent. This extension ratio is generally stated in the literature as between 1/5 and 1/30 of the current electrode spacing. Maintaining this ratio is critical for ensuring the accuracy of the measurements and the reliability of the data obtained.

5.4.2. Wenner Configuration

In the Wenner system, all four electrodes are placed at equal intervals along a straight line. This setup allows for high-sensitivity measurement of the potential difference and is ideal for precise mapping at shallow depths (Zohdy, 1989). However, since all four electrodes must be repositioned for each measurement, the method is relatively labor-intensive in field applications (Fig. 8).

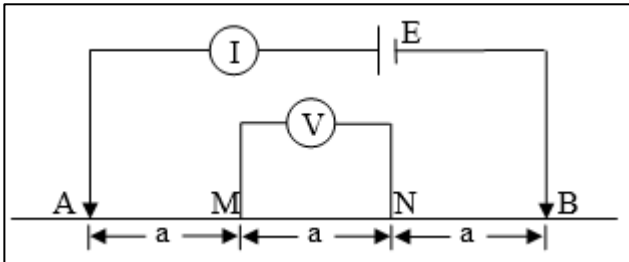


Figure 8. Wenner electrode configuration model

The basic electrode system consists of two current electrodes, labeled A and B, which are used to inject electrical current into the ground, and two potential

electrodes, labeled M and N, which are used to measure the voltage difference generated by this injected current.

$$k = 2\pi a \quad (14)$$

is obtained accordingly. The resistivity, in turn, is derived by substituting this expression into Equation (14).

$$\rho = \left(\frac{2\pi\Delta V}{I} \right) P \quad (15)$$

is thus obtained. The apparent resistivity values in the Wenner configuration are modeled as a function of the electrode spacing, denoted by a . In depth investigations using the Wenner array, the spacing a is increased stepwise by symmetrically expanding the electrodes to the left and right around a fixed center point. In lateral profiling and mapping studies, the electrode spacing is kept constant, and all four electrodes are moved along a survey line. Measurements are then taken in different orientations to continue the survey. During the mapping process, the apparent resistivity value calculated for each measurement point is positioned based on the center of the electrode array.

5.5. Comparative Analysis of Electrode Configurations

In archaeogeophysical studies employing the electrical resistivity method to detect subsurface features, the choice of electrode configuration plays a critical role in both data quality and operational efficiency. Among the most widely used setups, the Wenner and Schlumberger arrays exhibit distinct differences in terms of application context, resolution, and cost (see Table 1).

5.5.1. Voltage and Current Connections

In the Schlumberger configuration, the potential electrodes (M-N) are positioned close to a central point, while the current electrodes (A-B) are spaced more widely. This setup provides a significant advantage for field projects operating with limited manpower. The short spacing between the potential electrodes reduces the influence of environmental noise and allows for more reliable signal acquisition. Furthermore, potential electrodes are adjusted only after every 5 to 10 measurements, saving time and labor during operations.

5.5.2. Resistance to Interference

Another advantage of the Schlumberger array is its reduced susceptibility to surface anomalies and complex deep geological structures due to the shorter spacing of potential electrodes. This makes the Schlumberger system more effective in accurately identifying small-scale buried archaeological features.

5.5.3. Ease of Labor and Field Implementation

Because the Wenner array requires all four electrodes to be moved with each measurement, a team of at least four people is typically needed. In contrast, the Schlumberger system can be operated by just two people since only the current electrodes require frequent repositioning. Additionally, the measurement point in the Schlumberger setup is generally at the center of the array, allowing the geophysicist to better control both the data acquisition process and the team's movements—especially important in delicate excavation zones to minimize error margins.

5.5.4. Depth Capability

Theoretically, the depth of investigation in the Wenner array is approximately $AB/3$, while the Schlumberger array can reach up to $AB/2$. This difference enables the Schlumberger configuration to explore deeper subsurface structures using the same electrode spacing, offering an advantage in archaeological contexts where identifying the depth of buried features is crucial.

5.5.5. Time and Cost Efficiency

With fewer electrode movements and a lower labor requirement, the Schlumberger array is both time-efficient and cost-effective. Since electrode positions are changed less frequently, the system reduces downtime during stabilization phases, significantly shortening the duration of field operations. This makes it a preferred method for large-scale archaeological surveys due to its practicality.

5.5.6. Monitoring Measurement Errors

The Schlumberger array also offers benefits during data interpretation. Because the field curve obtained tends to display symmetrical features at different depths, any misfit in one wing of the curve is likely to be reflected in the other. This property allows geophysicists to detect potential errors earlier and provides a form of self-validation during data evaluation.

Table 1. Comparative Table

Feature	Schlumberger Configuration	Wenner Configuration
Depth Sensitivity	High	Medium
Lateral Resolution	Medium	High
Labor Requirement	Low (2 people)	High (4 people)
Data Accuracy	Medium	High
Adaptability to Field Conditions	High	Medium
Cost-Effectiveness	More economical	Relatively expensive

Schlumberger configuration is less affected by surface disturbances due to the fixed position of the potential electrodes. Wenner configuration, on the other hand, is more suitable for precise measurements because it generates a larger potential difference. However, it carries a higher risk of being influenced by lateral heterogeneities.

6. Interpretation and Practical Notes

The electrical resistivity method has evolved into an interdisciplinary tool that not only contributes to the technical aspects of archaeological and geoarchaeological research but also demonstrates significant analytical power when combined with geographical thinking. This approach, which focuses on understanding the subsurface extensions of landscapes, establishes a strong connection between geography's spatial analysis paradigm and archaeology's historical-cultural inquiry. The method contributes uniquely to geographic knowledge production by identifying subsurface structures and mapping their interactions with natural geographical features.

From a geographical perspective, the datasets provided by resistivity methods are not limited to physical imaging. When integrated with Geographic Information Systems (GIS), Digital Elevation Models (DEMs), and remote sensing technologies, these spatial data sets open the door to multi-layered, causality-based analyses. In this context, the electrical resistivity method can be regarded not just as a geophysical technique, but as a practice of geographic interpretation. For example, analyzing the relationships between settlement areas and topographic slopes, hydrological systems, or lithological units through resistivity profiles provides concrete insights into the environmental choices of past societies.

For geographers, this method enables the reading of the "subsurface layers of the landscape" and introduces an analytical dimension in which space is interpreted not only on the surface but also in depth. These analyses contribute to the three-dimensional modeling of the relationship between environmental determinants and cultural production. Electrode configurations such as Schlumberger and Wenner, with their varying depths and lateral resolutions, offer researchers the opportunity to interpret both geomorphological features and cultural layers comprehensively. This aligns with one of the core principles of geographical thinking—multi-scalar spatial analysis—and integrates it into archaeological field applications.

Another crucial dimension to consider is the differentiation of anomalies caused by natural versus cultural factors in the interpretation of resistivity data. Natural features such as groundwater, sediment transitions, or mineral variations can generate electrical signals similar to those of archaeological structures.

Therefore, interpretation requires a conscious research approach, not merely measurements. For geographers, this process blends geographic knowledge with spatial and cultural analysis into a reflective practice. Evaluating field data alongside layers such as topography, soil types, moisture content, and geological structures enhances interpretability.

The field of geoarchaeology allows for the reinterpretation of geography's fundamental concepts such as space, place, environment, and scale, while providing a theoretical basis to dynamically trace human-environment interaction through time. In this respect, the electrical resistivity method not only facilitates the physical mapping of buried features but also enables understanding of their causal relationships with the landscape. This methodological capacity fosters interaction with subfields of geography such as cultural geography, environmental history, paleo-climate studies, and environmental analysis.

In conclusion, the electrical resistivity method is not merely a technique for visualizing subsurface structures, but a powerful geographic interpretive tool that reconstructs human-environment interaction from a historical perspective. When combined with archaeology and geophysics, this method allows space to be understood in a three-dimensional and temporally layered manner, in harmony with geography's core research principles. This interdisciplinary approach not only aids in understanding the past but also supports the development of strategic knowledge models that can contribute to contemporary environmental planning and landscape management policies. Thus, geographers are positioned not as passive observers in this knowledge production process, but as active interpreters and contributors to policy-making.

Acknowledgment of Contribution

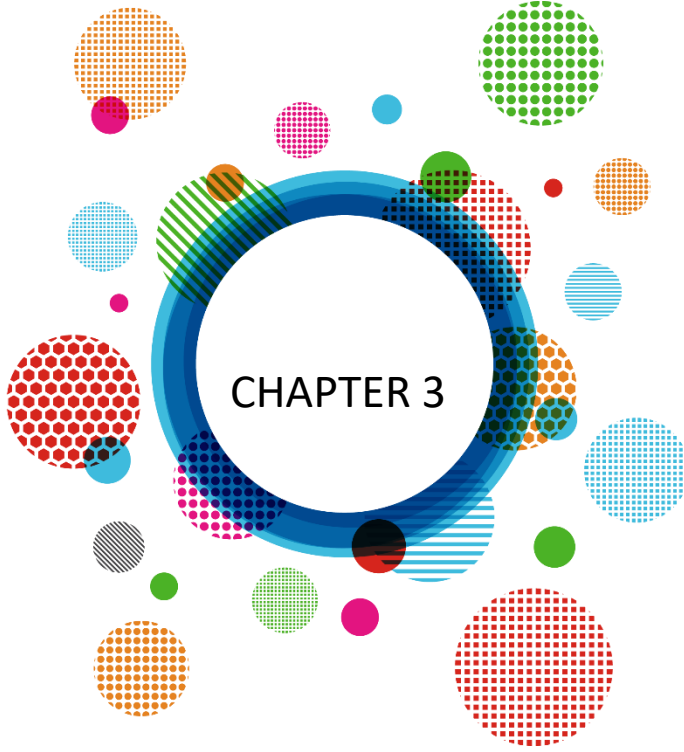
This study shares thematic connections with the author's master's thesis.

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In the Shadow of Original Sin: The Quest for Independence and Financial Sovereignty in Emerging Financial Markets

Meltem Keskin¹

¹ Ankara Yıldırım Beyazıt University, Şereflikoşhisar Faculty of Applied Sciences, International Trade and Logistics, Orcid Id: 0000-0002-8536-4940

INTRODUCTION

This study examines the structural dependencies that developing countries face in their financial markets within the framework of the concept of "original sin" and evaluates the financial independence quest of these countries through the conceptualisation of "financial sovereignty". The concept of original sin, introduced to the literature by Eichengreen, Hausmann and Panizza (2003), refers to the fact that countries cannot borrow in international markets in their own currencies for long-term purposes. This situation pushes developing economies, especially those with fragile financial infrastructures, to borrow in foreign currency, which creates serious macroeconomic vulnerability to exchange rate shocks. It is emphasised that original sin is effective not only in terms of borrowing but also on financial sovereignty and monetary policy practices.

In the first part of the study, the historical roots and development process of original sin are analysed; it is argued that this concept is not only a technical debt problem but also reproduced in the context of the centre-periphery relations of the global financial system (Reinhart et al., 2003). Through examples selected from Latin America, East Asia and Africa, the strategies developed by developing countries against this structural problem are examined. Policies such as encouraging local currency borrowing, increasing national savings rates, regulating capital flows and deepening domestic financial markets are evaluated and their success is discussed in a historical context.

In the second section, it is emphasized that developing countries are seeking autonomy not only in economic but also in political decision-making processes within the framework of the concept of "financial sovereignty". It is argued that the global financial structure can intervene directly or indirectly in the domestic politics of these countries through international credit rating agencies, the IMF, the World Bank and large-scale investment funds (Stiglitz, 2002). In this context, financial sovereignty is associated not only with the structure of debt instruments but also with the ability to shape decision-making processes in line with national interests.

In the last section, an evaluation specific to Turkey is presented. The structural reforms implemented after the 2001 economic crisis, the restructuring process in the banking sector, regulations regarding public financial discipline and especially the increasing private sector borrowing in foreign currency after 2010 are analysed in the light of the original sin literature. The Turkish example reveals both the continuity of financial vulnerabilities and the limits of institutional and political responses developed against these vulnerabilities.

In this context, the study reveals that developing countries need not only technical tools but also strong institutional structures, a long-term development

vision and a more egalitarian representation system in the global financial system strengthen their financial sovereignty. Thus, the study aims to contribute to the theoretical and empirical discussions at the intersection of development economics, international finance and political economy.

Historical Origins of Original Sin. Original sin attracted attention after the Latin American and Asian crises. Historically, this problem has been fed by colonialism, foreign debt tradition and institutional weaknesses.

LITERATURE REVIEW

A review of the literature reveals that the foundations of the concept of “original sin” are primarily based on the works of Eichengreen, Hausmann, and Panizza. The term “original sin” was first introduced into the academic literature by Barry Eichengreen and Ricardo Hausmann in 1999. It is used to describe the inability of emerging market economies to borrow in international markets in their currencies. In their 1999 study, Eichengreen and Hausmann argued that original sin increases the financial fragility of developing countries and exacerbates the risk of crises due to foreign currency-denominated borrowing.

In the early 2000s, the literature expanded and began to explore additional dimensions of the concept. Studies during this period revealed that original sin is not only related to external debt, but also closely linked to the depth of domestic financial markets, the structure of financial institutions, and the credibility of monetary policy. In a 2001 study, Hausmann et al. developed new indicators to measure original sin and analysed exchange rate policies within this framework. In 2003, Hausmann and Panizza proposed several hypotheses to explain the persistence of original sin, discussing factors such as currency credibility issues, lack of financial market depth, biases in foreign investor preferences, and the structure of global liquidity.

Within this context, the literature also explores policy recommendations to address original sin. These include deepening local financial markets, implementing institutional reforms, achieving macroeconomic stability, promoting regional bond markets, and regulating capital flows.

The global financial crisis has further revitalised interest in the concept of original sin. Especially in the post-2008 period, the volatility of capital flows and the impact of monetary expansion policies on emerging markets became focal points in academic research. Levy et al. (2007) emphasised that original sin affects not only borrowing practices but also financial sovereignty and the implementation of monetary policy.

Although the number of studies specific to Turkey is relatively limited, various reports by the Central Bank of the Republic of Turkey (CBRT), the

OECD, and the World Bank, as well as certain academic theses and articles, provide valuable insights. Yeldan (2001), for instance, evaluated Turkey's financial vulnerabilities within the framework of original sin during its financial liberalisation process. Bal and Özdemir (2012) found that changes in Turkey's exchange rate regime, institutional structure, and domestic debt markets between 1998 and 2010 had significant effects on original sin indicators. The CBRT's Financial Stability Reports (2022) also include analyses regarding the impact of foreign currency borrowing on systemic risk.

THEORETICAL FRAMEWORK

The concept of original sin was first systematically defined by Barry Eichengreen and Ricardo Hausmann in 1999, and later expanded by Hausmann, Panizza and other academics. The concept explains the limited capacity of a country to borrow in its own currency in domestic and foreign markets, and therefore its exposure to external shocks (Eichengreen & Hausmann, 1999). It is argued that this situation depends not only on economic indicators but also on the institutional and political dynamics of the global financial structure.

Monetary Policies, Foreign Exchange Debts and Sovereignty. As a result of original sin, developing countries become very sensitive to fluctuations in exchange rates. This sensitivity prevents the central bank from effectively implementing interest rate policies. Institutional and financial depth deficiencies further increase this dependency. Fiscal policies also become limited due to the increasing interest burden and exchange rate risk.

The historical development of original sin is closely related to international monetary arrangements, especially in the post-Bretton Woods period. With the US dollar becoming the central currency, developing countries were encouraged to borrow in foreign currency. The debt crises experienced in the 1980s and the financial crises in developing countries during the 1990s (Mexico 1994, Asia 1997, Russia 1998, Argentina 2001) made this structural fragility visible (Reinhart et al., 2003).

The structural adjustment programs implemented by the IMF and the World Bank during this period also made the financial architecture of developing countries dependent on the outside. The loss of reputation of national currencies, low financial depth and lack of institutional capacity caused the original sin to take root. For example; Argentina, Indonesia and Turkey Argentina painfully experienced the consequences of the dollarisation-based borrowing strategy during the 2001 crisis. Indonesia, on the other hand, became dependent on the IMF due to excessive foreign currency borrowing during the 1997 Asian Crisis. Although Türkiye improved its public debt structure after 2001, foreign exchange borrowing at the private sector level still creates fragility.

The Quest for Financial Sovereignty

The relationships that developing countries establish with the global financial system are often shaped by external debt, monetary policy constraints and fragile macro structures. In this context, the concept of "original sin" explains the problem of developing countries' inability to borrow long-term in national currency, while also bringing a deep "financial sovereignty" problem to the agenda. This study evaluates the financial dependency relations that have developed around the concept of original sin, together with their effects on the sovereignty capacity of developing countries. The aim is to discuss the limits, possibilities and historical context of the policies developed to re-establish financial sovereignty.

The Effects of Original Sin on Financial Sovereignty

1. Foreign Exchange Debt and Exchange Rate Risk

Foreign exchange debt causes the public and private sectors to be vulnerable to exchange rate shocks. When the currency depreciates, the debt burden increases exponentially and the flexibility of national fiscal policies decreases.

2. Loss of Monetary Policy Independence

Central banks of countries are forced to adjust interest rates according to market expectations to keep exchange rates stable. This creates a situation that conflicts with inflation targeting and growth policies (Calvo & Reinhart, 2002).

3. Dependent Relationships with the IMF and International Institutions

Global credit rating agencies and international financial institutions can narrow the policy space of developing countries through assessments and interventions

Strategies in the Quest for Financial Sovereignty

1. Local Currency Borrowing Initiatives

Countries such as Brazil, Indonesia and South Africa have diversified their public bond programs to increase local currency borrowing in the domestic market.

2 Capital Controls and Macroprudential Policies

As seen in the examples of Malaysia (1998) and China, controls on capital movements have strengthened national financial stability.

3. Regional Financial Integration and Alternative Institutions

Institutions such as ALBA Bank in Latin America and AMRO (ASEAN+3 Macroeconomic Research Office) in Asia represent alternative searches for the global financial system.

Alternative Policies The development of local currency bond markets, capital controls, multilateral swap agreements and the use of reserve currency baskets are among the solutions to this dependency. Regional financial cooperation mechanisms are also important. The prominence of institutions such as China's Asian Infrastructure Investment Bank contributes to the development of alternative financial architectures.

Regional Outlooks: Latin America, Asia, and Africa

The effects of original sin vary regionally. Latin American countries are among the most commonly associated with this concept due to their historical experiences of high inflation and currency crises. Asian countries, especially after the 1997 crisis, have taken more cautious steps in their external debt structures and have tried to limit this dependency through reserve accumulation and capital controls. African countries, on the other hand, have generally been unable to escape this vicious cycle due to their low financial depth and dependency on foreign aid.

The Course of Original Sin in Türkiye

1. Financial Liberalisation After 1980

Within the framework of the policies of opening up to the outside world after 1980, Turkey entered the process of financial liberalisation and capital movements became free. However, since this process was not supported by a solid macroeconomic and institutional infrastructure, the economy became open to external debt and exchange rate risk (Yeldan, 2001).

2. Reforms After the 2001 Crisis

After the 2001 financial crisis, Turkey implemented serious financial and structural reforms under the supervision of the IMF and the World Bank. However, while the borrowing dynamics of the public sector were brought under control, the private sector's borrowing in foreign currency, especially in the energy and construction sectors, increased rapidly (OECD, 2014).

3. Developments After 2010

The low global interest rate environment in the 2010s increased capital inflows to developing countries like Turkey, which made borrowing in foreign currency attractive. The external debt of the private sector in Turkey exceeded

300 billion dollars as of 2020 (TCMB, 2022). A significant portion of this debt is in foreign currency.

4. 2018 and After: Currency Crises and Monetary Policy

The currency crises experienced in 2018, 2020 and 2021 revealed the effects of original sin in Turkey. Discussions on the independence of the Central Bank and reserve management policies increased the pressure on the exchange rate (Eichengreen, 2019).

Table 1: Results in the Context of Original Sin in Turkey

Indicators	Status (as of 2022)
Private Sector Debt in Foreign Currency	Approximately 283 billion USD (TCMB, 2022)
Currency Risk and Credit Rating	BB- level, high risk of currency shock (S&P, 2023)
Local Currency Long-Term Bond Market	Below the developing country average (World Bank, 2021)
Monetary Policy Independence	Limited (OECD, 2023)

4. Financial Sovereignty Studies in Turkey

With the structural reforms implemented after the 2001 crisis, Turkey has made its financial markets more integrated. However, this integration resulted in the private sector's increasing foreign exchange debt and high external financing dependency. In addition, with the structural reforms implemented after the 2001 crisis, Turkey has made its financial markets more integrated. However, this integration resulted in the private sector's increasing foreign exchange debt and high external financing dependency.

The exchange rate shocks experienced in the 2018 and 2020 periods have revealed the limitations of Türkiye's monetary policy capacity.

The discussions on the independence of the CBRT and the increasing need for foreign exchange reserves deepen Turkey's financial sovereignty problem in the context of original sin.

In the post-2021 period, the Central Bank has adopted the "lira transition" and "lira-ization" policies and encouraged TL-denominated borrowing in the domestic market. However, the fact that inflation has been in double digits during this period has limited domestic investor confidence.

The household savings rate in Turkey is low compared to developed countries. Increasing domestic savings and deepening capital markets play a critical role in overcoming original sin (World Bank, 2021).

In recent years, Turkey has aimed to increase its foreign exchange liquidity by making swap agreements with countries such as Qatar, China and South Korea. However, these temporary solutions do not provide long-term independence.

Criticisms and Alternative Approaches

The concept of original sin has been criticised by some critics for being deterministic and underestimating the impact of structural reforms (Rodrik, 2006). It has also been stated that this approach positions developing countries as passive recipients and does not sufficiently consider alternative development paths. Criticisms from the Post-Keynesian and dependency theory frameworks suggest addressing the problem of financial dependency in a more political-economic context. They emphasise that financial sovereignty is possible not only through technical regulations but also through the construction of political decision-making processes in line with national interests. In other words, the issue is not only "how the debt is borrowed" but also "for whom and against whom" the debt is borrowed.

CONCLUSION

New horizons in the struggle for financial independence, developing countries should implement structural reforms, increase local currency financing opportunities and build systems resistant to external shocks to achieve financial sovereignty. This process should be considered not only as a technical issue but also as a political and historical issue.

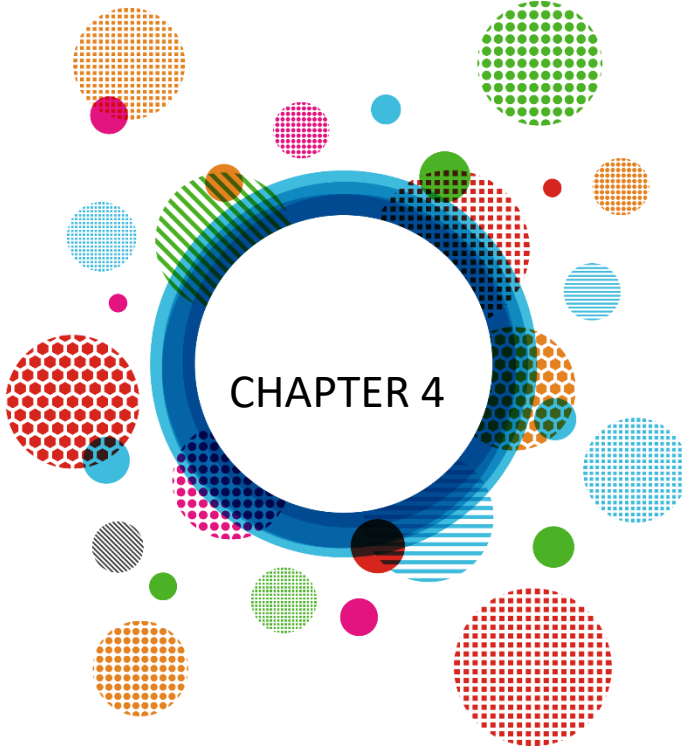
Original sin is not only a result of the financial vulnerabilities faced by developing countries, but also a structural element of the international financial system. The historical emergence, development and transformation of this concept in the literature show how global power relations and monetary policies are reproduced within the dynamics of the centre-periphery. The fight against original sin should be considered not only with technical reforms, but also with the search for national sovereignty, institutional capacity and global justice.

In order to overcome original sin, Türkiye needs to increase domestic savings rates, strengthen the principles of financial discipline and transparency and rebuild trust in the local currency.

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Sustainability in Financial Project Management

Yüksel Akay Ünvan¹ & Suda Zeynep Akgün²

¹ Prof. Dr, Ankara Yıldırım Beyazıt University / Business Administration, Finance and Banking, ORCID: 0000-0002-0983-1455

² (MA Student) Ankara Yıldırım Beyazıt University, Orcid: 0009-0006-9821-4796

1. Introduction

In business, a project is a one-time duty that is done to create an original goods or services. The process of executing a project is a progressive process that has to stick to strict rules about the project's results, like the amount of time, resources, and performance standards. As a result, it is essential to "manage" a project to guarantee that the goals are well-defined, the process is clearly organized, and the resource limitations, which include time, money, fundamental materials, and equipment, are observed. In this context, the term "project management" indicates the collection of methodologies, strategies, and techniques that are implemented to organize, execute, supervise, and regulate all of the processes required to fulfill the targets within a specific time period, as well as cost and quality frame (Pimenta et al., 2023).

In other words, the term "project management" refers to a tool that is used to execute and complete unique projects or responsibilities that are essential for the successful execution of a company's strategy. The regular workflow that is connected with the official organizational structure is not disrupted in any way thanks to this accomplishment. Generally, project management entails the development of a temporary management system and its subsequent implementation on top of the standard organizational framework to complete a specific activity or task.

Sustainability, which officially entered the literature in 1987 with the Our Common Future Report, is another important concept examined in this study. Since an increasing number of stakeholders, such as consumers, suppliers, partners, and investors, are pressuring businesses to recognize their impact on society and the environment, sustainability has become an indispensable aspect of the contemporary business landscape.

The purpose of the study is to analyze project management in finance and its relationship with sustainability. For this reason, a review of literature was utilized, which is a research technique that is commonly used to acquire comprehensive knowledge about a specific subject (Gil, 2011). A number of academic databases, including Scopus and Web of Science, were used for the fulfillment of a comprehensive and relevant literature review. Main focuses in the selection of the studies were the relevance of the studies to the subject matter, the accuracy and reliability as well as currency of the sources. Besides, the link between sustainability and project management in finance were used to prioritize the selection of the studies.

2. Elements of Project Management

One of the most prominent concept in connection with project management is *the project life cycle* which is a description of the stages that a project goes through from the time it begins until it is finished. Morioka and Carvalho (2016) includes stages such as project launch, strategy development, implementation, quality control, and completion in these phases, although the specifics of these phases can change based on the methodology that is employed.

The scope of the project is another essential concept that outlines the outcomes that are expected as well as the activities that need to be performed. It is recommended by Sabbag (2013) that the scope be well specified and recorded in order to prevent misunderstandings and changes that were not included in the original plan. To guarantee that the project satisfies the expectations of the stakeholders and to set goals that are achievable, it is vital to have a good scope. In other words, the scope of work should include the project's goals, specifications, and narrative descriptions of the work needed to complete it. Additionally, the material financial limits and other constraints (such as time) should be identified. However, it should be noted that it is possible the extent of the work could change as the work progresses and as more information is gathered about the expected outcomes for the amount of time and effort that has been spent on the project. This is the most significant potential challenge that the project manager may face in relation to the work scope.

Next concept is *resource management*. According to Gutterman (2023), the project manager is accountable for managing the multiple resources that need to be assigned to the project. The scope of the project is the defining factor that determines which resources are necessary to be delivered during the course of the project. For the purpose of classifying resources, there are a number of diverse categories that can be utilized, and each of these categories presents its own unique set of issues for management. In general, the most essential resources are "*human*," which includes personnel who have been directly assigned to work on the project as well as individuals from other departments within the organization. It is also the project manager's duty to guarantee that all project participants are aware of their responsibilities and are motivated to complete their assignments in a timely manner. In addition, the project manager must have Access to proper individuals whose skills and tools fit in the Project.

In addition to human resources, a project manager is accountable for *the administration of equipment and materials*. The task of managing equipment is comparable to the task of managing human resources; it entails ensuring that the appropriate equipment is available to carry out the required tasks in a timely manner and in accordance with the requirements that have been outlined in the management plan for the Project. In the experimental study conducted by Leite

et al. (2024), managers emphasized the significance of effectively allocating resources, which necessitates careful control of the resources that are at one's disposal in order to accomplish the goals that have been prescribed. This highlights the importance of using comprehensive planning and distributing resources in a balanced manner to get the best possible outcome for the environment.

Another concept under the sphere of the scope of the project is *time management*. When it comes to project management, effective time management is absolutely necessary in order to guarantee that resources are employed effectively within the timeframe that has been allocated. Programming software is utilized by project managers in order to schedule work, monitor progress, and determine the critical path, which is comprised of tasks that have no wiggle room (also known as "zero float"). As a result of the fact that projects frequently encounter time constraints, managers are required to coordinate tasks that overlap and prioritize the deployment of resources. Gutterman (2023) adds that it is essential to be flexible because unforeseen differences in the field of the project or the availability of resources may require alterations to the timeline. Keeping projects on track and within budget can be accomplished through effective management of the critical path and the ability to respond to changes.

Furthermore, Bella et al. (2019) emphasize the significance of project management, which includes *the identification of stakeholders* who involve in the work, and might be influenced by the results of the project and their engagement in the project. It is essential to have a complete awareness of their demands, expectations in order to guarantee that communication will be effective. This is accomplished by having a thorough understanding of their requirements. At this point, Gutterman (2023) makes mention of project documentation. He states that once the project has began, the stakeholders must be able to watch its progress due to the project managers and anyone else in the firm who has an interest in it providing the essential project documentation. This is because the project managers are responsible for ensuring that the documentation is in order. An initial plan, a preconditions specification, a project plan, a budget, and a description of the work organization are some examples of the types of documents that are often included in the documentation for a project.

Planning is another important part of project management because it includes setting goals, listing tasks, figuring out what resources are needed, making schedules, and telling people what their jobs are. Kerzner (2015) advocates that a project plan that has been carefully created can operate as an advisor to direct activities and track activities as time progresses.

One other essential component is *risk management*, which is necessary because every project is subject to the possibility of uncertainties and hazards that

could have an impact on its success. It is vital to identify, evaluate, and mitigate these risks in order to avoid difficulties and reduce the detrimental effects that may occur. Creating emergency plans and putting preventative measures into action are both required steps in this process. In other words, risk management is an indispensable element of project management, since it enables the identification as well as resolution of potential problems that might prevent the execution of a project within the restrictions of time and money. At this point, Gutterman (2023) divides risk into three subtitles: Critical risks which requires immediate attention, and large risks which necessities proactive mitigation as well as minor risks which are watched for escalation. In order to build suitable action plans, project managers are need to sometimes tolerate small risks while also having strategies for major interruptions, such as the absence of team members to perform their duties. It is vital to eliminate risks in certain circumstances, even if doing so arrives at a larger cost. Before making a decision regarding a management approach, additional research is required for risks that are hard to predict.

Furthermore, Leite et al. (2024) introduces the term of *environmental risks*. They argue that the detection and prevention of environmental risks become important parts, suggesting a new approach in project management in order to prevent negative effects on the environment. Consequently, this highlights the significance of conducting a thorough and continuing risk assessment in order to guarantee the continued success of environmental projects.

Another fundamental principle of project management is the importance of *effective communication*. In order to have effective communication, it is necessary to deliver information in a manner that is not only clear and correct but also timely between the parties involved, like project members and stakeholders. According to Keeling and White (2017), it contributes to the success of the project by fostering alignment, collaboration, and problem-solving within the team.

An experimental study by Leite et al., 2024 revealed that the managers' reports place an emphasis on the function that project management has in promoting interaction and teamwork between different departments. The implementation of this approach is regarded as essential in order to guarantee that expectations are effectively controlled and that outcomes are provided in accordance with the plans. By utilizing project management, departments and stakeholders may be linked in a more efficient manner, which enables communication to be more fluid and collaboration to be more effective. This is especially essential because of the complexity of the environment, where several players are involved in a project,

Additionally, *communication and collaboration* among all parties involved in a project are encouraged through project management, which helps to ensure that

expectations are controlled and that objectives are fulfilled. Therefore, it is possible for organizations to improve their potential for innovation, improve their capability to adapt to shifts in market status, and reach higher levels of achievement in their activities by choosing to utilize approaches that are connected with what is known as project management (Link et al., 2020).

In addition, *leadership* abilities are necessary for project management. A powerful project leader must possess a number of vital traits, including the capacity to inspire and motivate the team, to offer guidance, to arrive at decisions that are effective, and to resolve conflicts. According to Kerzner (2015), he or she is a critical element in the project's success and the management of human interactions.

Gutterman (2023) makes a contribution on the issue of project managers. Due to the fact that the project manager is frequently responsible for determining whether or not a project is successful, project management has become a distinct professional path that requires specialized education and certification programs. The assignment of line managers to the role of project managers is common in smaller firms; however, this can lead to disagreements in the distribution of resources. One of the most effective strategies is to employ full-time project managers who are capable of managing many projects in an effective manner. In addition to having knowledge of quantitative tools, organizational structures, and behavior, it is vital to have strong communication, problem-solving, and decision-making skills. Project managers are frequently developed internally by companies, which gives them the opportunity to gain expertise with minor initiatives before shifting their focus to larger ones. Professional certification, such as that offered by the Project Management Institute, is a form of professional certification that promotes credibility and expertise. Advanced project managers have the ability to mentor others.

In conclusion, Morioka and Carvalho (2016) emphasize the significance of *evaluation and continuous learning* in the subject of project management. It is essential to carry out an evaluation after the conclusion of a project in order to determine the valuable lessons gained, the areas of strength, and the areas that might use development. This information can be utilized for future projects, which will contribute to the ongoing improvement of project management as well as a rise in its overall effectiveness.

3. Sustainability and Project Management

The term of sustainability, which dates back to the North American Indians' balanced lifestyle between human activity and wildlife preservation as well as protection of next generations, is also mentioned in European law books from the 18th and 19th centuries. Its most widespread acceptance was with the report of *Our Common Future* in the World Commission on Environment and Development (1987). It is the first time in the history of international politics that sustainable development has been acknowledged as a topic of discussion for a variety of cities and governments all over the world.

In modern business world, sustainability has occurred as an essential component which influences the approaches that are used for project management. Since a growing number of stakeholders, including customers, suppliers, partners, and investors, force businesses to acknowledge the influence they have on society and the environment, the development of practices that value both moral accountability and environmental responsibility has increased. This change encourages organizations to incorporate sustainable strategies into their projects, which guarantees the production of long-term value while also limiting the negative affects on the environment and society.

As stated by Moutinho et al. (2025), sustainability can provide project managers with novel perspectives, assisting them in their final actions about the planning, and controlling of resources. This is achieved by considering ESG (the environmental, social, and governance) impacts of the products it produces, in addition to the project's lifecycle.

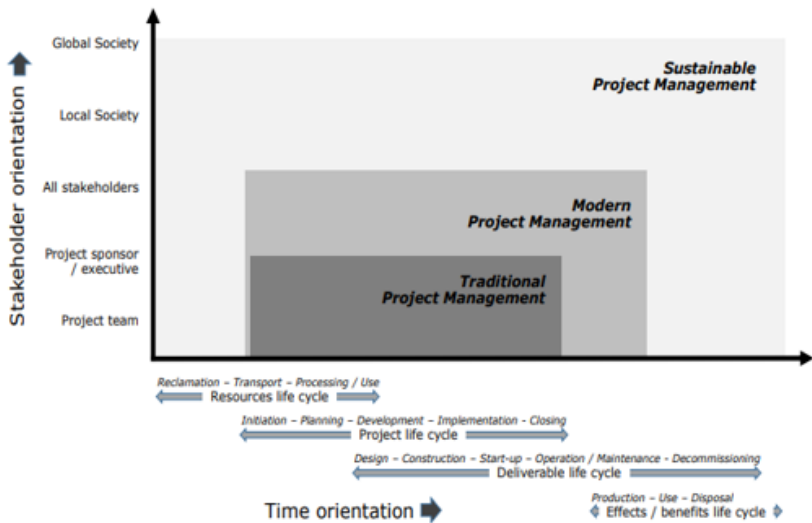
Huemann (2022) advocates that a shift in the scope of project management is required to achieve sustainability. This transition involves shifting the focus from controlling the time, budget, and scope to managing the creation of value in the social, environmental, and economic fields. This transition extends the context in terms of time and space. Silvius (2017) provides an illustration of this extension of the context as follows by using the context dimensions of stakeholder orientation and time orientation.

The transition process, as described by Nikolic et al., (2020) involves the conversion from a anticipated and manageable manner to a flexible, and advantageous approach. In this approach, project managers' aim is to bring sustainability view into firms to assume accountability for sustainable improvements.

It is necessary for project managers to confront obstacles and take on new tasks in order to build new competences in order to adopt sustainable practices. A shift in focus from traditional project management, which controls schedule, and money, to sustainable project management, which focuses on social,

environmental, and economic effects, is required. In other words, both a shift in approach are necessary to achieve the desired results.

Figure 1: The broadened scope of Sustainable Project Management



Source: Silvius, 2017.

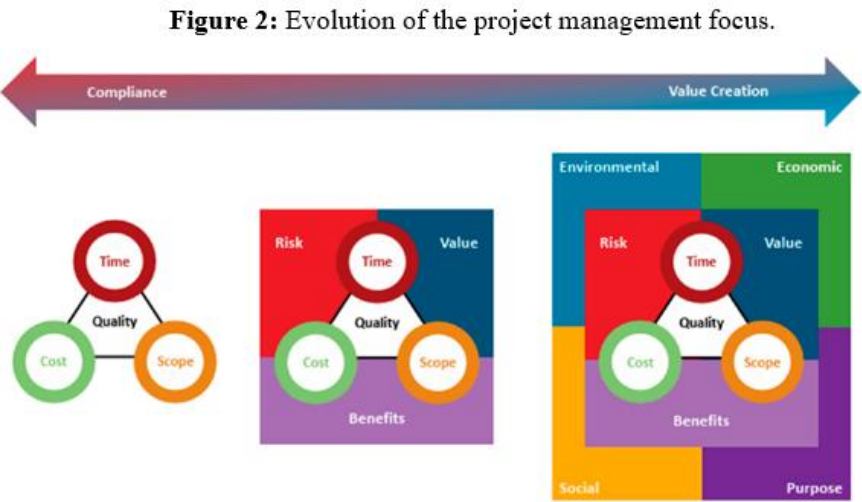
4. Motivations For Sustainable Project Management in Finance

Organizations that integrate sustainable practices into their strategic objectives and daily operations are perceived as getting a competitive advantage by integrating sustainability into their project management processes, which enables them to capitalize on new opportunities and innovate. Not only does this show solidarity, but it also makes money for the company. This supports the idea that economic well-being is linked to social well-being and protecting the earth. Sharma et al., (2024) advocate that sustainability in PM offers a proactive strategy for managing projects with a comprehensive perspective that includes environmental, social, and economic aspects while dealing with projects

In the study in 2023, Bello argues that sustainability in PM not only provides internal benefits for businesses like higher company reputation economic gains but also provides outside benefits for society and environment. In other words, obtaining benefits such as risk and cost mitigation, increased reputation, and stakeholder confidence are some of the benefits that implementing sustainable goals into PM processes provide. We may conclude that while businesses view sustainability as a source of competitive advantage, enhanced financial

performance and positive impact on project success can be seen as key motivation factors.

In conclusion, it can be said that project management has shifted from an emphasis on technical delivery to an approach that is more comprehensive, strategic, adaptable, and results-oriented, as a result of a reflection of the growing complexity of today's business environment. The figure below illustrates this transition:



Source: Carboni, 2018

5. Advantages and Disadvantages of Sustainable Project Management in Finance

5.1. Advantages

An experimental study conducted by Mertens et al. (2023) shows the effects of more socioenvironmental standards on finance companies. In general, it can be said that sustainability standards creates a change in bank's PM strategy, like exclusion of non-sustainable projects and transition from purely financial benefits towards rethinking social and environmental consequences. In addition, as it provides advantages like increase in reputation and competitiveness, it also causes drawbacks like difficulty in implementing and increasing costs.

One of the prominent advantages of a sustainable approach towards PM is that it may attract investors who are interested in sustainable investment strategies. For example, Kabai (2022). advocates that sustainable approach is preferable as it allows investors to gain a return while also supporting sustainable environmental initiatives Encourage investors to consider social and

environmental considerations while investing may help maintain the economy. Sustainable PM initiatives, like Green Bond, save the environment by using public, private and hybrid funds. Energy efficiency, water management, and pollution reduction can be given as an example of these initiatives. In summary, businesses invest in sustainable strategies for their financial benefits and positive impact on the environment.

Besides, according to Apenko et al., (2019) having an ideal balance between social, environmental, and economic principles in project management has an advantage in these indicators:

- A positive image of the organization
- The quality of process
- The value of project results
- An increase in the chance of project and product success
- A reduction in project risk

Additionally, Kerr and Avendano (2020) emphasized the possibility of sustainability-linked loans as a potential option for businesses who are aiming to increase their efforts to be more environmentally responsible. These loans may offer interest rate reductions to debtors who satisfy or surpass specific environmental, social, and governance (ESG) criteria.

To summarize, businesses are highly encouraged to adopt sustainable methods and technology because of the strong link that exists between financial expenditures and the performance of them in terms of sustainability. (Duque-Grisales et al., 2020).

5.2. Disadvantages

Popescu et al. (2021) see the lack of commonly agreed standards to measure the effect of investments on sustainability as an important obstacle in the field of sustainable finance. Investors would not be able to make choices based on social and environmental impacts if there were not a standard way to measure the sustainability performance of different investments. Therefore, the absence of specific measures creates barriers to openness and accountability, which in turn makes it more difficult to evaluate the actual impact that sustainable funding schemes have. The necessity of clear definitions, effective tools, greater training, and awareness can be counted as obstacles that must be overcome to successfully implement sustainable practices in project management (Orieno et al., 2024).

Also, according to Shah and Shah (2023), greenwashing, which means pretend to more sustainable than it is (Quoquab et al., 2022), decreases the public's and

investors' trust in sustainable finance by hiding the real environmental effects of their initiatives. Therefore, García-Sánchez et al., (2020) advocate that being honest and taking responsibility are key to getting long-term support. In short, being reliable and providing transparent information to investors are crucial to gain long-term rewards. Besides, setting clear reporting standards and guidelines for measuring and sharing the long-term effects of investments is another thing that needs to be done (Myronchuk et al., 2024).

Besides, it is possible that firms may fail to effectively implement sustainability procedures in project management processes since the execution of sustainability principles in project management necessitates a significant investment of resources and expensive for small companies (Khatip et al., 2020).

In short, with sustainable finance guidelines, there would be less room for greenwashing and more opportunity for openness and comparison, which will lead an increase the confidence of green investors. Next, improving the way regulations work is a very important first step toward fixing the problems of sustainable finance. also, there should also be consequences for greenwashing, and individuals who are responsible for making false claims about the effects of sustainable practices should be held accountable.

6. Methods for Sustainable Project Management in Finance

Sustainability is a critical element in the finance sector, not only with respect to environmental responsibility but also regarding delivering social and economic benefits. Sustainability is an important approach that enables financial institutions to plan and execute their projects in accordance with ESG criteria. Various tools and techniques have been developed to achieve success in sustainability-focused projects. Some of these are: Sustainability Impact Analysis (SIA), The P5 Standard for Sustainability in Project Management and The Sustainable Project Management Maturity Model (SPM3) as well as The Project Sustainability Excellence Model (PSEM).

Silvius and Schipper, (2020) argue that SIA is conducted during the project project launch or strategy development phases. The purpose is to evaluate the effects on the economy, the environment, and society in order to facilitate decision-making and strategic planning. There are several SIA tools, such as SPM3, the P5 Standard, and PSEM, have been developed to help project managers evaluate sustainability. However, their practical application and real-life effectiveness remain poorly documented.

Besides these techniques, Soares et al. (2023) introduce three more tools as well:

- First, SPM3, which was developed in 2010 for the first time, is a tool that assists businesses in implementing sustainable development by evaluating and enhancing the integration of sustainability into projects. In this model both the procedures of project management and the deliverables are evaluated individually, with consideration given to the influence that each could have on stakeholders and society. Within the framework, sustainability maturity is classified into four different categories: “compliant, reactive, proactive, and purpose”. The model employs a total of 22 sustainability indicators to evaluate development.
- Next, the P5 Standard for Sustainability in Project Management is a tool that assists in identifying and analyzing the potential consequences that a project may have on sustainability to facilitate decision-making and the distribution of resources. Based on the five P’s—Product, Process, People, Planet, and Prosperity. This ensures that initiatives are in accordance with the sustainability objectives of the organization by evaluating their effects on the local economy, corporation, society, and environment. Also, The P5 Impact Analysis (P5IA) is utilized to clarify the risks and opportunities associated with sustainability, with the goal of increasing positive effects while preventing adverse effects.
- Last, PSEM is designed to address the increasing significance of sustainability and innovation in the expectations of stakeholders. The classic iron triangle, which consists of cost, time, and quality, is expanded upon by this method, which incorporates sustainability and innovation into the evaluation of projects. Besides, the accomplishment of a project is assessed by PSEM through its contributions to the organizational and regional development.

7. Project Manager's Financial Literacy and Sustainable Project Management

Financial literacy is the knowledge and skills that a manager possesses in order to manage financial resources effectively. It has been widely mentioned in the literature that financially literate managers are more successful in project management because they have the knowledge and skills that are required for the realization of sustainable growth. For example, Kumari and Harikrishnan (2021) advocate that those managers who are financially literate have superior management abilities, which allow them to successfully address global concerns such as global warming and water pollution. As a result, they are equipped to tackle global warming change in a manner that is more efficient. Likewise, Stella

et al. (2022) determine that managers who has financial literacy are more responsible and socially conscious than those who are not.

Besides, according to Anderson and Robinson (2022), individuals must have a fundamental understanding of finance in order to recognize businesses that are ecologically sustainable. So, it can be said that people with insufficient financial literacy fail to invest in environmentally friendly projects as they do not have the information necessary to do so, although they have the intent to do so. A similar argument is made by Hashim et al. (2022), who state that the level of financial literacy possessed by a project manager is an important determinant in the sustainable project management's achievement.

It is possible to draw the conclusion that only having a desire to manage projects in a sustainable manner is not enough; rather, managers need to be more financially literate to recognize and evaluate the information that is required for sustainable project management.

However, the quantitative study done by Al- Nimer et al. (2024) reveals that inancially literate project managers do not place a significant degree of importance on environmentally responsible project management techniques that oppose previous studies. Seraj et al. (2022), for example, state that the managers' skills in managing financial resources lead to sustained business success.

8. Technology and Sustainable Project Management

The development of new technology and shifting paradigms in business are influencing the direction that project management will go in the future. Project management approaches are undergoing a transformation due to the execution of IoT technologies and Big Data as well as AI in the industry. Insights in real time, predictive analytics, and automated procedures are all provided by these technologies, which enables project managers to make decisions based on reliable information and maximize the results of their projects (Iriogbe et al., 2024).

This will further improve the role that project management plays in defining a prosperous and sustainable future. The continual evolution of project management methods, which is affected by technical breakthroughs and societal transformations, will further enhance this function. In spite of the fact that project management is constantly evolving to accommodate new difficulties and possibilities, it will continue to be an indispensable instrument for businesses to advance, expand, as well as successfully manage the future's unpredictability.

The growing influence of digitalization on project management underscores the demand for project managers to adapt to developing technologies to improve the success of projects and produce more value for the economy, the environment, and society. In addition, in order to successfully navigate modern technology,

project managers need to acquire the necessary knowledge and abilities and become proficient in new applications. When dealing with large-scale projects, it is vital to apply certain management concepts in order to solve the organizational and technological difficulties that arise. This will ensure that the project is both efficient and sustainable in the digital landscape (Orieno et al., 2024).

9. Conclusion

The concept of sustainability has emerged as a important principle of project management in financial industry, having an impact on the development of long-term goals and decision-making procedures. Findings from this study demonstrate that it has been proved that integrating sustainability into project management not only increases environmental and social responsibility, but it also boosts financial performance, and reputation of the company. The adoption of environmentally friendly methods comes with a number of problems, including the costs of implementation; nevertheless, the long-term benefits, which include an advantage in competition, exceed these challenges. Through the adoption of sustainability, financial institutions have the opportunity to generate project outcomes that are more responsible and adaptable, and that are in line with the goals of global sustainability.

Despite the fact that it offers a complete research of sustainability in project management within the financial industry, this study does have a few drawbacks. Since the scope of the study is restricted to the financial industry, but the methods of sustainability-driven project management may vary greatly from one industry to another. In addition, the rapid development of technology and the continuously shifting regulatory landscapes need a frequent reevaluation and modification of sustainability practices associated with project management.

It is possible that future research might address these constraints by undertaking comparative studies across a variety of businesses. These studies could provide valuable insights on best practices and issues that are specific to each sectors. Further, investigating the role that developing technologies like blockchain and AI play in improving the sustainability of project management could bring fresh perspectives on how to come up with unique solutions. By broadening the scope of research, future studies have the potential to contribute to a greater comprehension of how sustainability can be successfully incorporated with project management across a variety of industries.

Resources

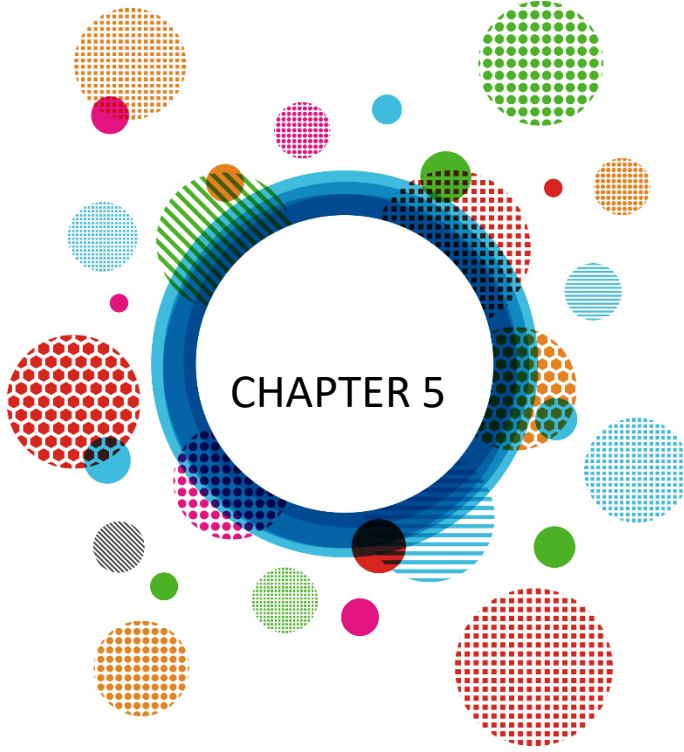
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Risk Management in Banking and Financial Projects

Yüksel Akay Ünvan¹ & Ismail Hassan Ahmed²

¹ Prof. Dr, Ankara Yıldırım Beyazıt University / Business Administration, Finance and Banking, ORCID: 0000-0002-0983-1455

² Student, Ankara Yıldırım Beyazıt University / Business Administration, Finance and Banking, ORCID: 0009-0000-0741-3033

1. INTRODUCTION

Risk management in banking is fundamentally dependent on detailed financial project analysis and shared perception of project status and requirements to maintain long-term prosperity. This helps to ensure risk mitigation far before the project implementation phase of any financial activity (Mustonen, 2024). Banking relies on identifying and assessing probable challenges and uncertainties likely to compromise project results. The goal is creating a uniform point of understanding within stakeholders on proceeding with financially prudent approaches. Mustonen (2024) clarifies that vision convergence among finances brings about precision, which helps when making key strategic decisions guiding the future direction of banking entities. This strategic vision fosters a culture of preparedness as well as decreased exposure to unsought financial disruptors.

A very important step in this process is pre-financial analysis, now part of sustainable project management. According to Anjanappa (2024), such preliminary assessments are conducted before mobilization of finance or human resources are very important tools that determine the viability of proposed projects. Use of financial measurements such as Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), and Profitability Index (PI) gives a rich insight into how likely a project is to deliver return and at what risk (Ali & Rafique, 2024). These measurements aid in the analysis of whether a project can be carried out regarding long-run value and wealth and without utilization misallocation. NPV and IRR facilitate determination of best use of capital by estimating the future returns, while PBP and PI give immediate indication of risk appetite and profitability of different investment opportunities. Financial project analysts are thereby able to develop a strategic framework maximizing project feasibility and ensuring financial viability.

Financial analysis has its own set of challenges, even though clear advantages lie in risk management. One of the significant issues is uncertainty in conditions outside the economy and internal constraints that may arise while implementing a project. As per Galevskiy (2024), tools such as cost-benefit analysis (CBA) and risk assessment allow one to approximate various financial scenarios and thereby empower managers with greater information upon which they can make their decisions. But financial analysts generally have to contend with challenges of tight regulatory regimes, erroneous projections, and market fluctuations, all of which skew decision-making. Such complexity requires financial analysts to constantly revise their models and have flexible methods for considering economic shocks or policy announcements. Therefore, though financial project analysis offers credible analysis on risk management, its effectiveness depends significantly on data correctness, institutional adaptability, and the capacity of the analyst to contain regulatory and economic risks.

1.1. TYPES OF RISKS IN BANKING AND FINANCIAL PROJECT

Strategic risk management in financial institutions is a critical component for ensuring robust regulatory compliance and maintaining financial stability (Adeniran et al 2024). Risk management is a critical component of banking and financial projects that ensures the stability and sustainability of financial institutions. The most significant risks that banks and financial institutions face are credit risk, market risk, operational risk, and liquidity risk (Oko-Odion & Angela, 2025). All these risks present their own problems that must be solved through precise mitigation strategies to achieve financial stability. The effectiveness of a bank's risk management system depends on its ability to detect, measure, and manage such risks in advance (Ahmed & Alam, 2023)

Credit risk is often associated with default, the inability or unwillingness of a counterparty to comply with obligations on time and/or in full volume, which leads to violation of the terms of the contract and allows the creditor to begin debt repayment procedures. A comprehensive analysis of the credit risk should not only include an assessment of the probability of bankruptcy of the counterparty but also consider the occurrence of credit events that lead to the deterioration of the creditworthiness of the borrower or the credit properties of financial instruments (Yanenkova et al 2021). It is among the largest risks to banks because lending is their central activity. Measures of credit risk mitigation are credit scoring models, collateralization, diversification of loan portfolios, and credit derivatives such as credit default swaps (CDS). Banks also apply strict underwriting standards and continuous monitoring of borrowers' positions to curtail possibilities of default. Guideline procedures laid down regulatorily, such as the Basel Accords, also stipulate rules for minimum requirement of capital adequacy for absorption of the potential credit losses.

Market risk is a risk that arises because of market movements from portfolios owned by banks, which can be detrimental to the bank (adverse moment). One factor that influence market risk is interest rate, which is measured by the difference between funding interest rate and loan interest rate. The difference between the total cost of funding and the total cost of borrowing is called Net Interest Margin (Subhan, 2021). Value at risk estimates potential loss within a confidence interval, whereas stress testing estimates the impact of extreme market conditions (Jumbe, 2022). Effective management of market risk involves diversification, hedging through financial derivatives, and constant monitoring of market trends to adjust investment positions accordingly.

Operational risk is the risk that arises as the result of failures in the work of employees, inadequate procedures and processes in a bank, inadequate information management and other systems in a bank, as well as due to

unforeseen external events (terrorism, crime, natural disasters, pandemics, cyber-attacks, crises). This risk negatively affects financial results and the capital of a bank to a greater extent than it might have seemed at first glance when analysing economic, quantitative indicators of banks, such as ROE, ROA, assets, etc. (Primorac & Kozina, 2022). Unlike credit and market risks, operational risk is more difficult to quantify since it is a consequence of both internal and external factors. Financial institutions use control procedures such as risk assessment systems, compliance systems, and cybersecurity to decrease the operational risk. Effective corporate governance, staff training, and technology application in transaction monitoring and fraud detection also enable the management of operational risk. Regulators emphasize the need for operational resilience and require banks to have effective back-up strategies implemented to deal with disruption.

Liquidity risk is the inability of a bank to meet its short-term financial obligations due to a lack of sufficient liquid assets (Sunaryo, 2022.). It can arise due to unexpected withdrawals, insufficient funds or constrained access to capital markets. Liquidity stress testing is a key tool used by banks to challenge their ability to withstand adverse liquidity conditions (Subramanian et al., 2022). Banks also manage liquidity risk through the maintenance of adequate cash buffers, diversifying funding sources, and adhering to regulatory liquidity requirements such as the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). Central banks play a crucial role in providing emergency liquidity support in times of financial crisis.

Overall, risk management in banking and financial projects demands an integrated approach that includes credit risk mitigation, measurement of market risk, controls for operational risk, and management of liquidity risk. Financial institutions employ various tools, frameworks, and regulatory guidelines to minimize exposure to these risks and attain financial stability. As international financial markets expand and evolve, banks must adapt their risk management policies to address emerging risks such as cyber risks, geopolitical risks, and economic crises. An effective risk management framework is essential to maintain trustworthiness, sustainability, and resilience in the banking sector.

1.2. REGULATORY FRAMEWORKS AND COMPLIANCE IN RISK MANAGEMENT

Risk management and compliance are fundamental pillars of corporate governance in the financial sector. They are critical to ensuring both financial stability and corporate reputation. Successful risk management entails a rigorous process of identifying, evaluating, and mitigating potential risks ranging from economic uncertainty and regulatory change to technological disruption, natural

disasters, and cyber-attacks. Enterprise Risk Management (ERM) refers to an organization's strategic structure for the embedding of risk consideration within the total operation, culture, and decision-making of the organization. This integrated method makes the organization more resilient and helps in making the proper judgements in times of uncertainty. Conversely, compliance management is designed to ensure that financial institutions are within the boundaries of regulatory frameworks and follow ethical guidelines. It is essential to be complying for stakeholder confidence-building and institutional image preservation. The banking case particularly presents an inherent relationship between risk management and compliance. Effective monitoring of operational, liquidity, credit, and market risks is important for financial stability. The failure of institutions like Chase Bank and Imperial Bank in Kenya emphasizes the disastrous impact of weak risk management frameworks. Among the various categories of risks, credit risk is most crucial, as its proper management lies at the core of long-term bank viability in competitive market economies. (Judijanto et al, 2024).

Basel I, II and III are fundamental international regulatory frameworks that inform risk management policies in the banking sector. Basel I, advanced in 1988, was interested in credit risk by mandating minimum bank capital levels (Masole, 2023). Basel II extended this scope by adding operational and market risks but keeping supervisory review and focusing on market discipline (Peridis, 2022). Basel III, developed in the wake of the financial crisis of 2008, further strengthened capital and liquidity requirements with a view to strengthening financial resilience (Ededjo, 2023). The accords themselves continue to shape and evolve in form to meet growing risks facing the world financial system (Hassan et al, 2024).

National and international regulatory bodies enforce compliance with risk management regulations for attaining financial stability. International financial regulations are overseen by institutions such as the Financial Stability Board (FSB), the International Monetary Fund (IMF), and the Bank for International Settlements (BIS) (Shavshukov & Zhuravleva, 2023). National regulatory bodies such as the U.S. Securities and Exchange Commission (SEC) and the European Central Bank (ECB) provide country-specific regulations that are aligned with international requirements. These institutions operate together to build a strong financial system that can weather economic shocks (Tiamgne, 2023).

In response to these challenges, financial institutions must adopt risk management strategies that embed compliance in their business models (Aledemat & Bein, 2025). Establishing strong governance structures, risk-aware corporate cultures, and technology-enabled regulatory reporting are pivotal steps towards compliance. Enhanced collaboration between regulators and financial

institutions can also improve the effectiveness of risk management regimes (Park & Kim, 2020). By ensuring transparency and adherence to regulations, institutions can enhance their resilience to financial risks while maintaining public trust.

1.3. RISK MANAGEMENT APPLICATIONS IN FINANCIAL PROJECTS

Risk management applications serve as vital mechanisms in risk avoidance by developing disciplined structures through which uncertainties can be examined and wise decisions made. The applications are developed employing various financial tools and techniques, such as capital budgeting, discounted cash flow (DCF) analysis, and scenario planning, in quantifying potential risk and its accompanying economic implications (Moro-Visconti, 2022). Using these tools, businesses can study project viability, forecast cash flow volatility, and take action to increase financial solidity. Further, artificial intelligence (AI) and machine learning-based financial digital apps complement risk assessment by identifying trends and forecasting potential financial disruptions (Tiwari et al., 2021).

One of the basic aspects of risk handling in finance projects is the application of hedging strategies to cushion against market movements. Companies apply derivatives such as options, futures, and swaps as a cushion against interest rates, currency, and commodity prices (Abaidoo & Agyapong, 2024). By accepting fixed rates or fixing prices, companies reduce their exposure to unwanted direction of markets so that stability in finance planning is maintained. Moreover, credit risk management forms the central aspect of project finance with lenders ascertaining the creditworthiness of borrowers based on credit scoring models and risk structures in a bid to minimize likely defaults (Kaur Brar et al, 2021).

Diversification is also one of the important risk-reducing techniques in project applications. Through investment across sectors, asset classes or geography, organizations can mitigate the impact of sector losses and economic shock (Cui, et al., 2024). Portfolio diversification seeks to minimize systematic risks through losses in one segment not having a considerable impact on overall financial well-being. Moreover, companies often use mechanisms of risk sharing, such as public-private partnerships (PPPs) and syndicated loans, to distribute finance exposure across many stakeholders, consequently reducing the workload on one single investor (Onabowale, 2024).

Compliance with regulatory standards and financial governance standards also supports risk management in financial project proposals. Basel III, for example, requires proper financial institutions to maintain proper capital buffers and liquidity buffers against the risk of economic uncertainty. Corporate

governance codes and transparency standards compliance maximizes the confidence of investors and reduces legal and operating risks. The implementation of internal controls, risk audits, and contingency planning makes organizations strong in the face of financial uncertainties, thereby safeguarding long-term financial sustainability (Yahaya, 2024).

1.4. THE IMPACT OF FINTECH ON RISK MANAGEMENT

Financial technology (fintech) has revolutionized risk management processes by bringing in new tools that allow firms to better forecast, analyse, and manage financial risks. The most significant contribution of fintech is probably the inclusion of AI and machine learning, which allows firms to process large volumes of data and identify potential risks in real-time. These AI applications are most appropriate to detect anomalies and forecast market change, allowing proactive strategy adaptation. With predictive analytics, companies can foresee market volatility, credit risk, and operational problems, thus helping them improve decision-making and minimize the risk exposure in finance (Cheng & Qu, 2023).

Blockchain technology is yet another fintech innovation that has transformed financial risk management through transparency and fraud prevention. Blockchain's decentralized character makes it hard for fraudulent activities to be hidden because all transactions are on a public ledger. Further, blockchain's application of smart contracts and self-executing contracts with the ability to autonomously enforce terms when conditions are met. It assists in reducing counterparty risk and lessens the potential for disputes or default. It enhances the security of monetary transactions at large and provides a greater trust in stakeholders (Surekha et al, 2022).

Risk management software has also been at the centre of modern finance, automating processes and facilitating real-time financial risk management. The software allows firms to track exposure to all types of risk, such as market fluctuations, credit risk, and operational problems, and alter plans accordingly. The software packages provide regulatory compliance by generating reports automatically, doing away with the risk of non-compliance penalties (Mei, 2022). The ability to monitor and respond to risks in real time is vital to corporations that wish to achieve stability in the face of an increasing altering financial environment.

Though the advantages of fintech in risk management are manifold, issues and limitations are associated with it that cannot be overlooked. Regulatory challenges, including the need to update existing laws to keep up with fintech developments, are a concern. Another concern that comes with dependence on technology is exposure to newer risks in the form of failure of systems,

cybersecurity threats, and excessive reliance on automated facilities. Firms must balance the use of fintech to manage risk with having sufficient controls in place to manage the risks that come with the technology (Sajid et al., 2023).

2. LITERATURE REVIEW

Banking risk management is an organized and systematic approach taken by banks to define, assess, and mitigate different risks inherent to their line of business. Risk management is instrumental in the promotion of the overall financial security and long-run survivability of banks, especially given the dynamics and uncertainties associated with the business of banking in contemporary times. The aim is to gain a prudent balance between venturing calculated risks and taking preventive steps such that banks can capture worthwhile opportunities without standing at high risks (Chhimwal, 2020)

The key component of a process like this is the acknowledgement of the fact that risks are far-reaching and diverse in nature ranging from credit risk, market risk, liquidity risk, operational risk and strategic risk. The most critical one among them is credit risk, which involves the risk that debtors may not pay their debt obligation. To keep this in check, banks develop stringent credit rating systems that consider a debtor's financial robustness, repayment behaviour, and availability of collateral (Lion & Abakasanga, 2024).

One of the key techniques to contain credit risk is diversifying loan portfolios, diversifying exposure among different industries and regions to mitigate the effect of defaults in any one sector. Further, maintaining strict standards of lending and keeping track of loan performance continuously enable banks to detect early warning signs of distress and act with timely corrective actions (Scannella & Polizzi, 2021).

The primary objective of risk management in banking is to reduce the adverse effect the various risks have on the financial performance of a bank. It involves outlining the overall role of risk management in banking institutions, its significance, and determining areas of potential development. It further encompasses the use of statistical techniques in the collection and analysis of data relevant to the issue, leading to educated conclusions and strategic recommendations for enhancing risk management models in banks (Kazbekova et al., 2022)

Risk management ranks among the highest indicators of bank governance quality, especially in situations that are characterized by uncertainty. It deals with both the threats and promises which such uncertain determinants pose to define the general success and stability of the bank (Manaf et al., 2021).

fintech has transformed the way commercial banks manage risk, both with new vulnerabilities and new potential. The negative is more competition, more data protection issues, and even potential vulnerabilities due to technology. The positive is new technology to enable more sophisticated risk assessment, better early warning systems, and better ways of managing risk (Palakurti, 2025).

To manage such changes to their prosperity, commercial banks must engage in strong partnerships with fintech firms, intensify their data protection, and raise technology innovation to the next level. Banks can empower themselves to cope with the fast pace of fintech innovations, improve their ability to manage risks and be a good player in an aggressive era of technology finance.

As fintech continues to develop in the coming years, its relationship with commercial banks will be anticipated to become increasingly interdependent and dynamic. Banks must continue to succeed in the long term, and they must always keep up with developing fintech innovations and continuously improve their risk controls to remain visionary and effective (Quimba et al., 2021).

Use of big data in the financial risk management has posed dazzling opportunities in front of the financial institutions. With the real-time and highly precise analysis of the data, the institutions can now identify and retain likely risks more effectively (Liu, 2024)

Despite the benefits, there are some drawbacks to utilizing big data such as concerns over the accuracy of data, privacy, cyber security and the need for specialized technical knowledge and well-trained professionals (Amer, 2024).

To reap the benefits of big data to the maximum, the financial institutions will continue to invest in the development of technology, improve their data governance strength, and construct able resources. It would be essential that all these things are done so that a strong platform could be made on which the financial sector could assure resilience as well as development in the times to come (Oyegbade et al., 2022).

Adoption of the risk management process outlined by ISO 31000 is crucial for small and medium enterprises (SMEs), especially in politically turbulent environments. The structured steps help firms minimize, manage or adapt to risks more effectively. Integration of risk management into the general strategic planning process, such as ensuring that it is consistent with the firm's vision, mission, strengths, weaknesses, opportunities, and threats, is essential to SMEs seeking to protect their capital, enhance profitability, and enhance their value (Makkawi, 2023).

It is recommended that SME owners and managers have well-designed strategic plans and be extremely accurate in risk management as this has a direct

bearing on the achievement of greater financial returns. Ultimately, SMEs will need to develop strategies that are tailored to suit their unique risk profiles to secure long-term business success. The adoption of technology with a forward-looking perspective, as well as the implementation of systematic risk management practices, is the key to sustaining growth and resilience in today's complex business environment (Aytar & Selamet, 2021).

3. CONCLUSION

Effective risk management is a cornerstone of financial stability and operational resilience in the banking and financial sector, particularly during periods of uncertainty. This study has addressed the general categories of financial risks such as credit, market, liquidity, operational, and systemic and emphasized the necessity of mitigation measures for each. Identification and management of these risks in advance are essential for institutions that seek long-term sustainability and resilience.

A robust regulatory framework is strictly indispensable to manage risk management plans and impose compliance throughout the industry. Regulators, by means like the Basel Accords, have implemented essential norms for capital sufficiency and risk management. Compliance with such frameworks not just ensures legal compliance but also fosters greater public and investor trust.

Practically, risk is handled by financial institutions with a wide array of tools. Credit scoring techniques, portfolio diversification, hedging products, insurance policies, and derivatives form the most integral parts of risk mitigation in today's times. Stress testing and scenario analysis are also possible with which institutions can simulate crisis scenarios and plan for them in advance, further facilitating strategic decision-making and systemic resilience.

Technological advancement has radically transformed the field of risk management. The fintech technologies of artificial intelligence, machine learning, blockchain, and big data analytics have offered hitherto unprecedented accuracy, efficiency, and security. AI enhances predictive analysis and fraud detection; blockchain gives transparency and integrity to the data; big data offers real-time risk measurement on a large scale; and automation compliance reduces operations errors and regulator transgressions.

To sum up everything that has been stated so far, these technologies point to a dynamic shift in financial risk management anticipatory, not reactive; automated, not manual positioning institutions to better navigate the complexities of the modern financial environment.

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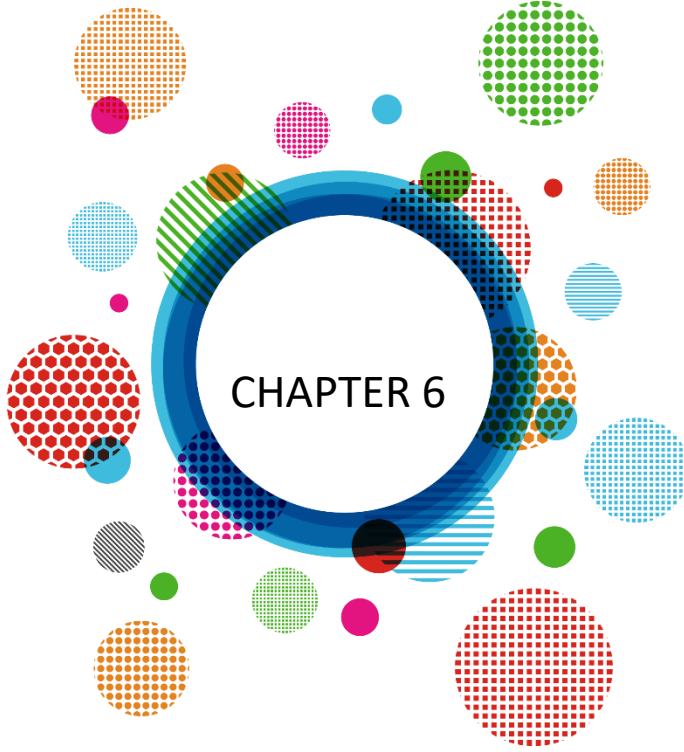
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The Role of Export Credit Agencies (ECAs) in Export Financing

Yüksel Akay Ünvan¹ & Nilab Said²

¹ Prof. Dr, Ankara Yıldırım Beyazıt University / Business Administration, Finance and Banking, ORCID: 0000-0002-0983-1455

² Student, Ankara Yıldırım Beyazıt University, Faculty of Business, Banking and Finance Ankara, Turkey, ORCID: 0009-0009-0448-1298

Introduction

Export credit institutions play a crucial role in international trade by providing financial support and risk mitigation for exporters. These government-backed institutions help businesses expand into global markets through credit insurance, direct loans, and guarantees. In a competitive global economy, access to financing and protection against commercial and political risks are essential, especially for small and medium-sized enterprises that struggle to secure funding through conventional banks.

One of the key institutions involved in export financing is the Export-Import Bank (Ex-Im Bank), which operates with a more structured approach. It provides direct loans, guarantees, and insurance to facilitate international trade, ensuring that domestic companies remain competitive abroad. Unlike many other financial support programs that primarily focus on risk mitigation, the Ex-Im Bank actively promotes national exports by assisting businesses that might otherwise struggle to access foreign markets.

Both export credit institutions and the Ex-Im Bank contribute significantly to economic development by fostering large-scale projects, creating jobs, and encouraging global trade. However, while various agencies offer broad-based support across different industries, the Ex-Im Bank often targets specific sectors or national interests. Some argue that government-backed credit support can sometimes lead to trade distortions and unfair advantages. In contrast, a structured institution like the Ex-Im Bank, with its well-defined policies and direct oversight, may provide a more balanced approach to export financing.

This paper examines the mechanisms of these financial entities, assessing their impact on international trade and evaluating which model is more effective. By analyzing their roles, benefits, and challenges, it aims to provide a clearer understanding of how export financing shapes the global market.

Literature Review

1. The Function and Importance of ECAs in Export Financing

Public export financing institutions are pivotal in international trade by providing crucial financial products, such as export credit insurance, direct loans, and guarantees, to mitigate risks associated with cross-border transactions (Ajija, Zakia, & Purwono, 2021). These services are vital for exporters, particularly those entering high-risk markets, as they offer protection against nonpayment risks arising from commercial defaults or political instability. This support encourages greater participation in international trade by minimizing uncertainties that exporters face (Kletzer, Mian, & Perez-Orive, 2023).

Government-backed institutions help businesses trade their products to other countries by providing financial support when private banks are unable or unwilling to lend money. These organizations play a crucial role in international trade by reducing financial barriers for exporters (Matray et al., 2024).

Such institutions function as financial facilitators by providing services trade credit insurance, direct financing and risk mitigation guarantees, which mitigate risks for exporters and facilitate global trade. These financial solutions support market expansion and enable companies to compete internationally (PwC, 2020). They also contribute to economic growth by backing large-scale, capital-intensive projects in sectors such as energy and infrastructure (National Bureau of Economic Research, 2023).

Government-backed export credits are instrumental in supporting large-scale infrastructure and industrial projects, especially in emerging markets. By providing the necessary financing for capital-intensive initiatives in energy, transportation, and manufacturing, these financial entities help sustain trade flows and economic stability across various regions.

State-supported trade finance programs assist businesses in exporting their products abroad by reducing risks and ensuring access to credit. Through loans, insurance, and guarantees, they enable exporters to navigate international markets, particularly when commercial banks are hesitant to take on such risks (Yazdi, Wang, & Kahorin, 2019).

Despite their positive contributions, export credit institutions (ECIs) face challenges such as aligning their financing activities with global sustainability goals and managing the risks associated with financing fossil fuel projects. A report revealed that over 30 countries collectively reduced public funding for overseas fossil fuel projects, yet the increase in clean energy funding was insufficient, indicating a need for more aggressive policy adaptations and financial commitments to achieve sustainable development objectives (McGibbon, 2024).

2. Challenges and Controversies Surrounding ECAs

Public export credit institutions play a significant role in supporting international trade by providing financial guarantees, insurance, and direct lending to exporters. However, despite their economic significance, these institutions face several challenges and controversies, particularly regarding their financial sustainability, regulatory compliance, and transparency.

One of the most significant concerns surrounding government-supported export financing institutions is their long-term financial sustainability. According to Pýcha (2021), these institutions often operate under the assumption that they

can remain financially independent through premium rates and fees. However, evidence suggests that many rely on state subsidies to cover systematic losses, raising concerns about their viability without government intervention. This issue is particularly relevant in cases where minimum premium rates fail to reflect actual market risks, potentially leading to long-term deficits.

Trade credit agencies face criticism for potentially creating unfair competition, as government-backed financing can give domestic companies an advantage over foreign ones. Critics suggest that these agencies need stricter rules to ensure fair trade. Additionally, some trade credit agency-funded projects have raised concerns about environmental and ethical issues, leading to calls for more transparency and alignment with sustainability goals (Mayer Brown, 2019; PwC, 2019).

Trade finance agencies are criticized for distorting global trade by giving domestic exporters an unfair advantage through government-backed financing, which can undermine fair competition for foreign firms (Kletzer et al., 2023).

Public trade finance entities face criticism for supporting projects with negative environmental and social impacts. Many large-scale infrastructure developments, such as mining operations, power plants, and oil pipelines, receive funding despite concerns about their effects on local communities and ecosystems. While some entities have introduced climate-friendly initiatives, the continued financing of fossil fuel projects remains a major issue. Environmental groups argue that these institutions should align their policies with international climate commitments and prioritize investments in renewable energy and sustainable development.

Another major concern is their potential to distort market competition. By providing government-backed financial support, public trade finance entities may give domestic companies an unfair advantage over foreign competitors, creating an uneven playing field in international trade. Although the World Trade Organization (WTO) prohibits certain export subsidies, these entities operate in a grey area where their support may indirectly function as a subsidy, leading to trade disputes between countries.

Additionally, transparency remains a significant challenge. As public institutions fund private businesses, there is a risk of insufficient oversight, making it difficult to assess whether their operations truly serve the public interest. Critics argue that a lack of disclosure in financing decisions can lead to corruption, favoritism, and politically motivated support rather than economically justified investments. Strengthening governance and implementing clearer reporting standards are essential to ensuring fair operations and sustainable global trade (Klasen & Schedler, 2024).

Government-backed trade finance institutions face several challenges, including regulatory constraints, geopolitical risks, and environmental concerns. One key issue raised by Downie and Peterson (2025) is the political influence over decision-making. In some cases, these institutions prioritize short-term economic gains over long-term sustainability, leading to continued financing of high-carbon industries.

3. ECAs and Small and Medium-Sized Enterprises (SMEs)

Public trade finance institutions play a critical role in enhancing international trade, especially for small businesses that often face significant barriers when attempting to access financing for cross-border transactions. These businesses typically struggle with limited access to capital, lack of credit history, and heightened financial risk, all of which make them less competitive on the global stage. State-supported trade agencies address these challenges by offering financial products such as credit insurance, direct loans, and guarantees to exporters, thus helping small enterprises mitigate risks and increase their participation in global trade.

Export financing bodies play a key role in supporting small businesses by providing financial tools like loans, credit insurance, and guarantees, which help them manage risks and expand internationally. These businesses often face challenges such as limited capital and financial risks, making them less competitive in global markets. According to İri and Gürbüz (2022), a country's credit rating influences how easily businesses can access finance, with higher credit ratings offering better conditions for small enterprises to secure funding. Trade finance institutions provide crucial support when countries have strong credit ratings, but low credit ratings can limit access to such assistance. Furthermore, these institutions also help exporters adopt sustainable practices by financing environmentally friendly projects, contributing to global sustainability goals.

Entrepreneurs and emerging companies often face difficulties in accessing financing due to limited capital and financial risks. Public trade finance institutions help by providing financial products like risk coverage, financial assurances, and funding solutions, which make it easier for these companies to engage in international trade. Arcuri and Pisani (2023) highlight the importance of government-backed trade finance organizations in helping environmentally focused enterprises in Italy access external credit during the pandemic. Their study shows that companies involved in green industries faced significant financial challenges but were able to maintain operations with the support of these institutions. The authors stress that government-backed trade finance organizations are critical in providing financial stability, especially for companies

working in sustainable sectors, allowing them to continue expanding internationally while contributing to global environmental goals.

According to Destek and Sinha and Wang et al. (2019), state-backed export credit agencies serve a crucial function by providing financial security during volatile political climates, which is particularly valuable for smaller exporters in developing economies. These exporters often face higher risks due to political instability, and the agencies not only provide essential financial resources but also offer political risk insurance. This support enables smaller firms to venture into markets that they would typically avoid. Wang et al. used Data Envelopment Analysis (DEA) to benchmark the performance of export credit institutions globally and concluded that export credit bodies significantly improve the operational efficiency of smaller and medium-sized firms by providing necessary financing during times of uncertainty. Their research highlighted that businesses with access to such support exhibited greater resilience and had more success in expanding their market share internationally.

Elmas and Koç (2024) analyzed the comparative efficiency of public trade finance institutions in Turkey and other emerging economies. Their research revealed that trade finance institutions in Turkey have effectively supported small exporters in gaining access to international markets, even in the face of challenges such as limited capital availability and exposure to exchange rate fluctuations. By mitigating these risks, these institutions have promoted greater trade participation, thereby contributing to the international growth of SMEs.

Furthermore, Yılmaz and Demir (2021) examined how small businesses benefit from credit guarantees provided by export credit institutions. They emphasized that these guarantees are especially crucial for smaller exporters who lack sufficient collateral to obtain financing from private banks. By offering such guarantees, trade finance institutions help mitigate financial risks for small enterprises, enabling them to secure the necessary capital to enter international markets and sustain their export operations.

4. Impact of ECAs on International Trade and Economic Growth

Public trade finance entities, such as trade finance agencies, have become pivotal players in supporting international trade by mitigating risks and providing financial backing to businesses engaged in cross-border transactions. These entities play a significant role in enhancing the competitiveness of companies, particularly in emerging markets, by offering trade protection instruments, credit enhancements, and financing options. The impact of these institutions on international trade and economic growth has been widely explored in academic literature.

According to Kızılkaya and Yılmaz (2021), public trade finance entities are instrumental in enhancing export volume and fostering market diversification, especially for countries with limited access to international financial markets. Their research suggests that the support provided by these institutions is vital for growing businesses, which often struggle to obtain financing from private banks. Additionally, these institutions help improve the risk profile of exporters, encouraging them to explore new international markets.

Arslan and Demir (2020) examined the role of Turkish export credit institutions in stimulating economic growth and supporting international trade. Their study found that government-backed trade finance institutions in Turkey helped exporters mitigate risks associated with currency fluctuations and political instability, two critical barriers to trade. By providing financial stability during economic crises, these entities facilitate trade, contributing to higher export volumes and overall economic growth. Additionally, the research highlighted the importance of credit guarantees in fostering long-term trade relationships and promoting sustainable export strategies.

In addition to facilitating exports, public trade finance entities have been shown to impact national economic growth. Aydın and Aslan (2023) found that trade finance institutions in Turkey contribute to GDP growth by enabling industries that rely on foreign markets to flourish. Their study reveals that the support from these entities leads to higher production levels and job creation, particularly in export-driven manufacturing sectors. Furthermore, the long-term economic stability provided by public trade finance entities enhances the resilience of national economies to global financial shocks.

Despite the positive impact of public trade finance institutions, some studies have pointed out the risks of market distortions caused by their interventions. Özdemir and Karagöz (2024) examined the potential negative effects of export credit agencies on competition. They noted that government-backed financing could create an uneven playing field, giving exporters with state support an advantage over competitors without such backing. However, they also acknowledged that the benefits of trade finance institutions often outweigh these concerns, especially in emerging economies where access to financing is limited.

5. ECAs as a Financial Bridge for Exporters

Exporting firms often require substantial upfront capital to manufacture goods and deliver them to international buyers. However, obtaining financing from private banks can be challenging, especially for firms operating in industries with high transaction costs or perceived risks.

State-backed export financing institutions help businesses sell their products in international markets by making it easier for them to get financial support.

They do this by offering credit guarantees, which encourage banks to lend money to exporters by reducing the risk of non-payment. These institutions also provide direct loans to businesses when private banks are unwilling to lend, ensuring that companies have the funds needed to fulfill export orders.

Additionally, they offer insurance against non-payment, which protects exporters from losses if foreign buyers fail to pay.

Assessing the efficiency of export financing institutions is crucial for understanding their impact on export performance. Wang et al. (2019) employed Data Envelopment Analysis (DEA) to benchmark the performance of these financial support entities across different countries. Their study provided insights into the operational efficiency of such trade finance providers, suggesting that performance benchmarking can identify best practices and areas for improvement, thereby enhancing their effectiveness in supporting exporters.

State-backed trade finance institutions have also been instrumental in shifting public export finance from fossil fuels to renewable energy. Censkowsky et al. (2025) analyzed 921 energy deals backed by these export financing bodies between 2013 and 2023, finding a substantial increase in support for renewable energy projects. This shift reflects their role in aligning financial flows with global sustainability goals.

Research on the intersection of trade finance and sustainability has highlighted the role of public trade finance institutions in balancing economic growth with environmental responsibility. Çetin and Ecevit (2023) examined the broader implications of trade openness and renewable energy consumption on environmental degradation in Turkey. Their findings suggest that government-backed export credit entities not only facilitate trade in renewable energy sectors but also help industries reduce their environmental footprint. By bridging financial gaps for exporters, these institutions play a crucial role in enabling businesses to transition toward more sustainable practices.

Expanding on this perspective, Altay Topcu (2021) explored the relationship between export activities and ecological footprints in Turkey, emphasizing the impact of state-supported trade financing institutions. His study demonstrated that these entities provide financial stability while simultaneously promoting sustainable growth in export-driven sectors. Similarly, Karakaya and Yılmaz (2022) reinforced these findings by highlighting how renewable energy investments within export-oriented industries contribute positively to ecological sustainability. Their research underscores the increasing importance of export credit agencies in financing renewable energy projects, supporting industries in adapting to the global shift toward cleaner energy sources.

Further evidence of the significance of trade finance institutions comes from Destek and Sinha (2019), who analyzed the role of state-supported financing bodies in mitigating risks faced by exporters, particularly during periods of financial instability. Their study revealed that public trade credit institutions provide counter-cyclical financial support, which is particularly valuable during global economic downturns when private funding becomes scarce. This function highlights the stabilizing role of these institutions in sustaining international trade flows and supporting national economies in times of crisis.

Beyond financial stability, trade credit agencies also contribute to long-term trade relationships. Wang et al. (2019) demonstrated how the use of methodologies such as Data Envelopment Analysis (DEA) can benchmark the performance of export credit organizations, showing that these institutions significantly enhance the operational efficiency of exporters. By ensuring financial continuity during uncertain periods, these agencies enable exporters to maintain strong trade partnerships, ultimately securing long-term success in the global marketplace.

6. Economic Impact of ECAs

Trade credit institutions play an indisputable role in international trade by offering export credit solutions, financial backing, and lending mechanisms to support exporters. These entities assist companies in entering new markets, derive economic growth, and help stabilize global trade during times of financial uncertainty. Their contribution significantly influence export expansion, trade financing, and broader economic development.

Export financing authorities contribute significantly to export growth by reducing risks associated with international trade. Cetiner, Eke, and Peker (2019) analyzed the role of export credit insurance in Turkey and found that it played a crucial role in increasing export volume. The study demonstrated that businesses using export credit insurance had higher trade performance, enabling them to expand into new markets with reduced financial uncertainty. One of the most significant contributions of trade finance authorities is their ability to provide trade credit and guarantees that facilitate exporter access to capital. Many Turkish exporters relied on export financing authorities-backed financing to secure loans from commercial banks, and the involvement of these authorities significantly reduced the cost of borrowing, making trade financing more accessible to businesses of all sizes. Additionally, these authorities mitigated risks during the 2008 financial crisis, ensuring that exporters had access to trade credit even when commercial banks became reluctant to lend. This ability to provide counter-cyclical financial support strengthens the overall economy and reduces the likelihood of economic recessions driven by declining exports.

Export credit providers play a crucial role in supporting international trade by offering financial security and enabling exporters to engage in high-risk transactions. Dorożyńska and Dorożyński (2022) highlighted that without their support, many small and medium enterprises (SMEs) would struggle to secure financing for international trade, limiting their growth potential. The authors further emphasized that industries backed by these providers often experience long-term economic stability, as companies with access to export financing are less vulnerable to economic downturns. This stability ensures sustained employment and income generation for workers in export-driven industries. During financial crises, these institutions play a crucial role in stabilizing trade. They pointed out that during the COVID-19 pandemic, many of them increased their support mechanisms, preventing a sharp decline in international trade. Their government-backed credit guarantees helped businesses continue their export operations despite global economic disruptions.

State-supported trade finance entities contribute to GDP growth and job creation by boosting exports, stimulating economic activity, and supporting industries that rely on foreign markets. Syshchuk and Hrytsiuk (2021) highlighted that increased export financing leads to higher production levels, which generate employment opportunities in both manufacturing and service sectors. Additionally, their research demonstrated that these institutions help overcome liquidity constraints faced by exporters, particularly during economic downturns. Firms receiving government-backed financial assistance were found to be more resilient to global financial shocks compared to those relying solely on private funding. Despite their positive impact, public trade finance bodies have been criticized for potentially distorting market competition. These entities are argued to give government-backed exporters an advantage over competitors who do not receive similar support, creating market imbalances where businesses with state-backed financing dominate industries at the expense of those relying on private-sector credit.

7. The Export-Import Bank (Ex-Im Bank) and Its Functions

Institutions that support international trade play an important role in facilitating exports by offering financial instruments such as insurance against default, underwriting support, and capital provision. By mitigating risks associated with global markets, these financial entities help businesses, particularly smaller enterprises, expand their operations beyond national borders. This literature review explores the functions of export credit agencies, their impact on trade performance, and their effectiveness in various economies, drawing insights from recent academic studies.

One of the primary functions of trade-financing organizations is to provide international trade protections, funding guarantees, and liquidity support to

exporters. Yapanoğlu (2021) examines Turkey's system of export support, emphasizing the role of Türk Eximbank in reducing financial uncertainties for businesses engaged in international trade. Similarly, Yılmaz (2020) highlights how financial assistance programs helped sustain Turkey's export sector, particularly during economic downturns such as the COVID-19 pandemic. The study finds that these credit programs were instrumental in preventing a sharp decline in outbound trade, reinforcing the importance of state-backed financial support in global commerce.

Similar institutions operate in other major economies, playing a key role in mitigating financial risks for exporters. For instance, the Export-Import Bank of the United States provides loans, guarantees, and insurance to businesses facing geopolitical or economic uncertainties. A report by the U.S. Government Accountability Office (GAO, 2019) highlights the effectiveness of its underwriting policies but suggests improvements in lender oversight and program evaluations. These findings align with research on other trade-financing institutions, such as Türk Eximbank and the Export-Import Bank of China, which also aim to bridge financing gaps in international trade.

In a comparative study, Ünvan & Moniruzzaman (2023) analyze trade-financing institutions in China and Bangladesh, shedding light on differences in their structures and funding mechanisms. The research highlights that while both nations use these institutions to enhance foreign trade, their strategies differ—China operates on a larger scale with strong government backing, whereas Bangladesh focuses more on developmental projects. This comparison provides insights into how different economies tailor their financial support systems to align with national trade policies.

Empirical research indicates that financial assistance plays a crucial role in boosting exports. Akarsu, Aldan, & Torun (2024) investigate the effect of rediscount credit—a form of subsidized export financing—on firm-level performance in Turkey. Their study finds a strong positive correlation between rediscount credit usage and export growth, particularly for emerging businesses. However, the research also highlights diminishing returns at higher levels of credit usage, suggesting that excessive reliance on financial support may not necessarily yield proportional trade benefits.

Yapanoğlu (2021) further discusses the efficiency of export financing mechanisms, noting that while these programs enhance trade competitiveness, their long-term effects are difficult to evaluate due to shifting global economic conditions. The study raises concerns about the sustainability of credit-dependent growth, suggesting that policymakers should balance financial support with measures that encourage long-term self-sufficiency among exporters.

A significant challenge facing the institution is the fluctuating demand for its services, particularly in the renewable energy sector. Research highlights how effectiveness is often constrained by the structure of the U.S. renewable energy industry. Unlike traditional energy exporters, renewable firms face difficulties in securing financial support due to its demand-driven operational model (Springer, 2025). This indicates that while the bank plays an essential role in export financing, its effectiveness is shaped by external economic and industrial factors.

Conclusion

This study has highlighted the indispensable contribution of government-backed trade finance institutions in facilitating international commerce by minimizing financial exposure and broadening access to funding for exporters. Their support is especially critical for small and medium-sized enterprises, which often face obstacles in securing capital through traditional financial channels. By providing risk mitigation services, financial guarantees, and strategic lending solutions, these entities empower businesses to operate with greater confidence in global markets, thereby promoting sustainable economic development. Institutions like the Ex-Im Bank play a particularly pivotal role by not only offering these financial services but also targeting specific sectors, ensuring that national interests are actively promoted in the global marketplace.

Nonetheless, this analysis has also brought attention to several persistent challenges, such as potential market imbalances, concerns over long-term financial viability, and the need for enhanced transparency. As the dynamics of global trade continue to shift, it becomes increasingly important for these institutions to modernize their frameworks, align more closely with international regulatory standards, and emphasize responsible, forward-looking investment strategies. Tackling these issues will not only improve operational effectiveness but also reinforce trust and credibility in their mission.

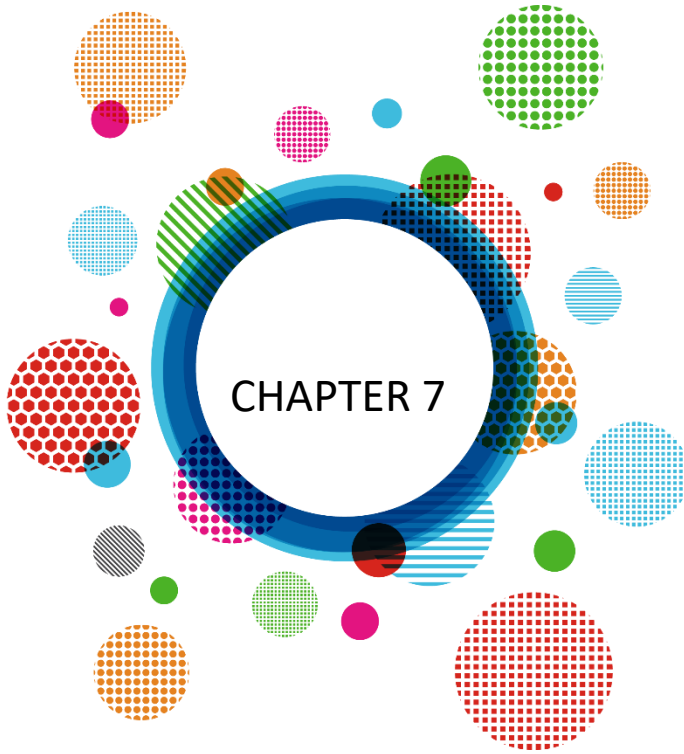
Looking forward, the continued relevance of export finance providers will hinge on their responsiveness to emerging trends such as the rise of digital trade, the prioritization of environmental sustainability, and evolving geopolitical landscapes. Embracing innovation, adopting data-driven strategies, and expanding their portfolio of financing tools can further enhance their role in supporting global trade ecosystems. Future research will aim to incorporate in-depth case studies and quantitative evaluations to build a more detailed and evidence-based understanding of how these financial mechanisms influence international trade. This approach will support more informed policy recommendations and a refined perspective on the evolving function of export financing in a globalized economy.

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Technical Textile Technologies and It's Industrial Usage Areas

Ayşe Seha Akman¹ & Metin Çancı²

¹ Yalova University, Department of International Trade and Finance, PhD Student,
ORCID NO: 0000-0003-2450-7036

² Yalova University, Department of International Trade and Finance, Prof. Dr., ORCID NO: 0000-0002-2152-0975

1.Introduction

Thanks to the developments in the field of materials science, technology-based textile products obtained by combining and changing textile materials in different ways have been included in the literature as ‘Technical Textiles’. Technical textiles refer to products that are produced by loading classical fibers with features that can fulfill technical functions and turning them into high-performance fibers.

‘Technical Textiles’, as defined in the “Textile Terms and Definitions” published by the Textile Institute, are textile materials and products produced primarily for their technical performance and functional properties rather than their aesthetic and decorative properties (The Textile Institute, 1991).

The same institution defined the concept of technical textiles as follows: "Textile materials and products composed of fabric and fibre components selected with primary consideration for their performance and properties rather than their aesthetic and decorative characteristics, for use other than non-protective clothing, home furnishings and floor coverings." (The Textile Institute, 1995).

"Technical textiles are high value-added products with superior performance and functional properties such as chemical and flame resistance, non-flammability, weather resistance, resistance to microorganisms, high strength, quick drying, flexibility, and impact absorption (Mecit et al., 2007). Advanced performance fibers are approximately 50% lighter than steel structures while offering superior properties such as higher strength, corrosion resistance, and durability (Ehrenstein, 2006; Adolphe et al., 2016)."

Due to the relationship between the functional properties and weight of the fibers used in technical textiles, technical textiles dominate an increasingly growing market across many industrial sectors. These materials, which become high-performance fibers through specific production processes, are typically used as components within other materials during their manufacturing. In particular, composite materials derived from carbon fiber offer superior performance characteristics and significant potential for cost reduction, which has led to a wide variety of applications for technical textiles in industry (Horrock, 2004; Strasser, 2012). In industrial applications, technical textiles are used in filtration systems, conveyor belts, transport and transfer components, belts, felts, insulation materials, composite structures, and sealing elements.

Technical textile production, where technical properties and functionality are prioritized, has become a highly attractive field due to the high added value it generates, and its areas of application have diversified significantly. Technical textiles are used in a wide range of sectors such as automotive, construction,

medicine, transportation, shipbuilding, energy production, mining, machinery manufacturing, and infrastructure projects, as well as in defense, aerospace, healthcare, sports, and fashion apparel. They are widely utilized in various applications including seat belts in the automotive industry, surgical sutures in the medical field, geotextile products used to separate soil layers, horticultural fabrics for protection against solar radiation in agriculture, and protective textiles such as superhydrophobic fibers (Aldalbahi, 2021).

Among the advanced technologies used in the production of technical textile materials, high-performance fiber manufacturing, specialized coating and lamination techniques, 3D textile constructions, nonwoven surfaces, production technologies, and composite material technologies stand out. Additionally, laser cutting, plasma treatments, ultrasonic bonding, and nanotechnology-assisted functionalization methods are widely employed to enhance the performance of technical textiles. In recent years, the industrial applications of technical textiles have been continuously diversifying and deepening in parallel with technological advancements. These products are increasingly prominent across all sectors due to their ability to make industrial production processes more efficient, safer, and more sustainable.

2.Areas of Application for Technical Textiles

Technical textile products possess superior performance characteristics such as high strength, corrosion resistance, and durability, along with a cost-effective structure. Fibers used in the technical textile sector are approximately 25% lighter than aluminum and 50% lighter than steel structures. Compared to aluminum, they offer up to 20% higher specific strength and stiffness, and exhibit high resistance to chemicals. These properties make technical textiles indispensable in industrial production fields (Ehrenstein, 2006).

The combination of light weight and high durability in technical textiles continues to drive increasing demand based on emerging application areas. For instance, in aircraft manufacturing, the use of lightweight fibers developed through technical textile technologies—much lighter than heavy metals such as stainless steel, titanium, and aluminum—helps reduce fuel consumption and emissions. This is because reducing an aircraft's weight with composite materials decreases the energy required to accelerate the vehicle. Considering the cost advantage provided by the reduced weight in terms of fuel efficiency, the importance of technical textiles in aviation becomes evident, particularly in aircraft, helicopters, and spacecraft (Albrecht, 2006, as cited in Kalaycı et al., 2014). A similar benefit is observed in automobiles, where lightweight composite materials are used to enhance fuel economy and reduce exhaust emissions. This makes it possible to maintain performance while significantly mitigating environmental issues (Patel et al., 2018). Therefore, materials produced with

technical textile technologies—thanks to their excellent mechanical properties and lightness—have become increasingly significant in sectors ranging from the automotive industry to aerospace and wind energy."

The expansion of technical textile usage into industrial fields is viewed as a potential driver for sustainable growth, particularly through a focus on high-quality, complex products and value-added components. It has been recognized that the potential growth in technical textiles will influence all industrial sectors, from developed countries like Germany to developing ones like India. In his study, Strasser (2012) emphasizes that, in Germany, the sustainable growth potential is strongly linked to retaining key parts of the value chain and industrial production domestically in the long term. He asserts that among the various technical textile technology groups, there is no other technology as crucial as the production of fiber-reinforced composite materials for achieving these goals. The connection between Germany's goal of positively shaping international competitiveness through its automotive, aerospace, and wind energy industries and its focus on technical textile production stems from the superior performance characteristics and exceptional cost-reduction potential of materials developed with technical textile technologies.

Chugan discusses India's development potential in the technical textile sector, which is experiencing growing demand both in foreign and domestic markets, especially as the country has relatively lost its competitive advantage in the traditional textile industry. It is noted that India may regain its weakened position in conventional textiles by focusing on technical textiles, which are seen as a driving force for economic growth. Chugan also examines the Indian government's support measures for investments in technical textiles, recognizing emerging global economic trends. These government incentives include customs duty concessions on the import of technical textile machinery, reduction of excise duty on synthetic fiber consumption, provision of high-strength yarns at competitive prices, the creation of a comprehensive database covering all application areas of technical textiles, support for research and development aimed at product innovation, and the establishment of special incentive schemes to attract foreign direct investment in the technical textile sector (Chugan, 2011).

The environmental contribution of technical textile production makes the developments and innovations in this field significant. This contribution arises from the insulation properties of technical textiles. Thermal insulation is a practical and important application for achieving energy efficiency. Buildings, which are considered major energy cost factors, can be heated using high energy consumption in cold weather conditions and cooled in hot weather conditions through thermal insulation applications (Al-Homoud, 2005). By reducing energy consumption, this contributes to environmental sustainability and presents long-

term cost benefits, which are both environmental and economic factors. Considering that space heating and cooling account for approximately 50-70% of energy usage (The US Department of Energy, 2002), the environmental contribution of technical textile applications becomes evident.

For every unit of energy saved through the use of technical textiles, resource savings are achieved, and the annual operational costs associated with producing that unit of energy are reduced or eliminated. By incorporating technical textiles, energy conservation is supported as the most cost-effective energy strategy for the future.

Another factor that highlights the importance of technical textile applications is their contribution to earthquake preparedness and mitigation. Through carbon and glass fiber-reinforced fabrics, technical textiles play a crucial role in enhancing structural durability by reinforcing beam and column connections. Another notable application is textile-reinforced cement. Technical textile applications developed in the building and construction sector continue to evolve, indicating that technical textiles will be increasingly utilized in diverse areas of the construction industry.

Geotextile-based ground reinforcement applications are also included in earthquake mitigation efforts. Strengthening urban infrastructure such as city foundations, parks, bridges, shopping centers, and other public construction projects through ground reinforcement enhances their reliability and durability. Soil stabilization systems reinforced with specialized textiles help prevent soil liquefaction and represent significant pre-earthquake mitigation practices (Varan & Durur, 2014; Siddique, 2015; Eren & Soyarslan, 2016; Raupach & Morales Cruz, 2016). The technical textile sector has become a vast and increasingly expanding industry that supports numerous other sectors.

3. Classification of Technical Textiles

Technical textiles are currently classified into 12 broad areas depending on their application purposes. In Horrock's book on the technical textile industry, the application areas of technical textiles for industrial use are discussed as agricultural technical textiles (Agrotech), building and construction sector technical textiles (Buildtech), protective clothing technical textiles (Protech), technical components of footwear and clothing (Clothtech), geotextiles (Geotech), home technical textiles (Hometech), industrial technical textiles (Indutech), medical textiles (Medtech), transportation technical textiles (Mobiltech), packaging textiles (Pachtech), sports technical textiles (Sportech) and ecological and environmental technical textiles (Ecotech) (Horrock, 2004).

Table 1: Classification of Technical Textiles According to Application Areas

Transportation technical textiles	Mobiltech
Building and construction sector technical textiles	Buildtech
Agricultural technical textiles	Agrotech
Protective clothing technical textiles	Protech
Technical components of footwear and clothing	Clothtech
Geotextiles	Geotech
Home technical textiles	Hometech
Industrial technical textiles	Indutech
Medical textiles	Medtech
Packaging textiles	Pachtech
Sports technical textiles	Sportech
Environmental technical textiles	Ecotech

Source: Horrock, 2004

3.1. Transportation Technical Textiles

Transportation technical textiles are known in the literature as *Mobiltech*. The use of textile products in transportation is not a new concept. Due to the historical use of textile ropes and sails, transportation has long been associated with textiles. In fact, the origins of human aviation—such as balloons, zeppelins, and early aircraft prototypes—are also closely linked to textile materials.

Today, these areas of application have significantly diversified with technological advancements in the field of technical textiles, extending to the construction of automobiles, railways, ships, aircraft, and even spacecraft. Textile components are increasingly being used in the construction of vehicles, ships, and aircraft—not only in interiors but also in engines and structural bodies. For instance, the average weight of textile components used in the production of a single car ranges between approximately 20 to 35 kilograms (Chen, 2010; Çokkeser & Çeven, 2011; Adolphe et al., 2016).

These components are generally categorized as visible and hidden elements (Sheraz, 2020). *Mobiltech* products serve various functions such as filtration, insulation, and protection. Other examples of *Mobiltech* products include parachutes, inflatable boats, and hot air balloons. Visible components include seat covers, seat belts, airbags, and tire cords. Textiles used in engines and car bodies, hoses, filters, and insulation textiles in vehicle bodies are considered hidden components.

3.2. Building and Construction Sector Technical Textiles

Technical textiles used in the building and construction sector are referred to in the literature as Buildtech. These products are used either as standalone textile materials or as composites reinforced with textiles. Designed for use in new construction or building reinforcement, they offer functional properties such as noise reduction and thermal insulation—like roofing textiles that help maintain indoor temperature levels.

Buildtech textiles can be evaluated in terms of their contributions to earthquake resilience and energy conservation. In this context, technical textiles play a crucial role in earthquake mitigation through reinforcement of beam-column joints and textile-reinforced cement applications (Varan & Durur, 2014). Al-Homoud, in his study, considered buildings to be major energy consumers in all countries. Instead of wasting energy to heat buildings during cold winters or to cool them during hot summers, it is possible to reduce annual energy costs through thermal insulation provided by textile-based coatings (Al-Homoud, 2005). Examples of technical textiles in the construction sector include: textile reinforcements for concrete, sound-absorbing panels, thermal insulation panels, and carbon fiber textiles used as reinforcement materials in earthquake-resistant buildings.

3.3. Agricultural Technical Textiles

Agricultural technical textiles are known as Agrotech in the literature. Agricultural technical textiles are used in agriculture, horticulture, fishing, forestry, and animal husbandry. They can be produced from natural and synthetic fibers. Thanks to the features of keeping air and soil temperature at the desired level and facilitating germination (Marasovic and Kopitar, 2019), protecting agricultural products from adverse climatic conditions (Surwase and Singh, 2023), and controlling factors such as water and humidity in open agricultural planting areas (Dorugade et al., 2023), successful results are obtained on agricultural product quality and productivity.

In addition to providing protection from weather conditions, other functions of agricultural technical textiles include protection from mosquitoes, protection from birds, insulation, packaging properties, shades, knotted fishing nets (Chowdhury et al., 2017). Agricultural technical textiles are a very broad area of technical textiles. Some common examples of agrotech products are: soil erosion prevention textile, shade. sun, bird nets, hail protection and harvesting nets, crop covers, bird protection nets, hail prevention nets, fishing nets.

3.4. Protective Clothing Technical Textiles

Protective clothing technical textiles are known as Protech in the literature. Protective clothing is clothing worn to protect against the risk of exposure to adverse environmental conditions. They are used in areas that require protection of people from harsh environmental conditions. These clothing are special textile products developed against various negative external factors such as cold, heat, fire, voltage, radiation, chemicals, microbes, impact, abrasion, water (Cireli, 2000).

Their areas of use are quite diverse due to their technical features. Some areas of use are as follows; firefighter clothing, camouflage clothing, bulletproof vests, butcher gloves against cuts, biker clothing, antimicrobial clothing, waterproof clothing, high visibility clothing, nuclear, biological and chemical protective clothing, high altitude clothing, UV protective clothing (Scott, 2005). Some areas of use of protective clothing technical textiles are as follows; Military and police equipment (Revaiaha et al, 2019), occupational safety and industrial protection, aviation and automotive sector, impact resistant and UV protective sports clothing.

3.5. Technical Components of Shoes and Clothing

Technical components of shoes and clothing are known as Clothtech in the literature. They are textile products used to meet the functional requirements of clothing. It refers to the lining and similar technical components of clothing and shoes. Some examples of Clothtech are: Lining, elastics, sewing thread, shoe laces (Sheraz, 2010).

3.6. Geotechnical Textiles

In the literature, geotextiles are referred to as Geotech. These technical textiles serve key functions such as reinforcement, stabilization, separation, and drainage. Geotextiles are also widely used for slope stabilization. Another important function is filtration, which helps prevent environmental pollution from industrial waste and oil spills (Aldalbahi et al., 2021).

Thanks to their broad performance characteristics, the application areas of geotextiles are diverse and expanding (Sarsby, 2007; Subaida et al., 2009; Venkateswarlu et al., 2018), including:

- Reinforcement of surfaces in road construction, airports, tunnels, dams, buildings, parking lots, and asphalt pavements
- Strengthening systems for railway beds, natural and artificial water reservoir edges, and bridge or overpass supports

- Preventing the sliding of steep soil walls through structural reinforcement

3.7. Home Technical Textiles

Home technical textiles are known as **Hometech** in the literature. These textiles are designed with various performance features such as waterproofing, fire or heat resistance, flame retardancy, insulation, and absorbency. Hometech textiles are commonly used in applications ranging from upholstery and carpets to water-resistant shower curtains, heat-resistant oven mitts, and waterproof tablecloths (Sheraz, 2010).

Some common examples of Hometech products include: Vacuum cleaner filters and air conditioner filters used in cleaning and filtration, filling fibers for mattresses and pillows, curtains, floor and wall coverings, upholstery fabrics for furniture, flame-resistant oven mitts.

3.8. Industrial Technical Textiles (Indutech)

Industrial technical textiles, commonly referred to as Indutech in the literature, are textile products specifically designed for use in various industrial production sectors. These textiles offer functionalities such as transportation, separation, filtration of water, air, and oil, and are applied in a wide range of industrial processes and solutions. These technical textiles, such as ropes, are primarily used in transportation, ports, oil rigs, and defense sectors (Nair & Pandian, 2006).

A significant application of Indutech textiles is found in conveyor belts, which are essential components in the transportation of intermediate or final products between processes on a production line. Conveyor belts made with coated technical textile materials in contrast to modular plastic or mechanical belts are tailored to meet the specific demands of various industrial sectors (Heide, 2007).

These belts must be resistant to temperature, chemical exposure, or mechanical stress depending on the application. Common examples of Indutech products include: Conveyor belts, ropes, industrial filters, felts, cable components.

3.9. Medical Technical Textiles

Medical technical textiles are known in the literature as Medtech. These textiles have functions such as cleaning, absorbency, filtration, and protection. They have a wide range of applications, including artificial tendons, cartilage, artificial cornea, artificial joints/bones, vascular grafts, heart valves, and artificial blood vessels made from fabrics like gauze, bandages, surgical drapes, etc. (Ersoy et al., 2015; Adolphe et al., 2016; Sheraz, 2020; Das et al., 2021; Öncü and Kaygusuz, 2023).

Medical technical textiles are divided into wearable and non-wearable categories (Sheraz, 2020). Examples of wearable products include face masks, baby diapers, patient diapers, patient gowns, doctor gowns, compression garments, protective clothing, and surgical stockings. Non-wearable products include artificial body parts, surgical sutures, handkerchiefs, bandages, gauze, and stitches.

3.10. Packaging Technical Textiles

Packaging technical textiles are known in the literature as Pachtech. These are textile products used for packaging purposes. These types of technical textiles are involved in the packaging of agricultural, industrial, and consumer goods. They are used to package items such as grains, vegetables, fruits, clothing, shoes, and electronic devices, among others. The goals of packaging technical textiles include facilitating the easy transportation of packaged materials, enabling easy long-term storage, and extending shelf life by controlling temperature and moisture transfer (Galic, 2011).

Examples of packaging technical textiles include durable papers, tea bags, industrial product packaging, adhesive tapes, and electrical insulation packaging. In the food sector, international standards and numerous regulations require the fibers used in technical textile production to comply with health standards.

3.11. Sports Technical Textiles

Sports technical textiles are known in the literature as Sporthtech. Sports technical textile products refer to textiles with functional properties for indoor and outdoor sports. These functional properties include protection against injury/impact, strength, water resistance, good comfort features, flexibility, recovery, and quick-drying, among others. These properties are shaped according to the specific needs of the related sport.

In sportswear, water resistance, antibacterial properties (Gulati et al., 2021), UV protection, self-cleaning ability, protection from heat and cold, features supporting blood circulation, quick drying, maintaining body temperature, resistance to chlorine and seawater, and resistance to sunlight are common (Montazer, 2017; Kadinkız et al., 2022). Sports technical textiles are expected to enhance an athlete's performance. It has been concluded that technical textiles used by athletes have an impact on their performance (Akçalı, 2016). Commonly used products in the Sportech field include climbing ropes, running shoes, artificial turf, parachute fabrics, sleeping bags, swimsuits, and so on (Sheraz, 2010).

3.12. Ecological and Environmental Technical Textiles

Ecotech and environmental technical textiles are known in the literature as Ecotech. Ecological textiles refer to products that can be produced, used, and recycled without harming human and environmental health (Cebeci, 2012).

Ecotech includes technical textiles related to environmental and ecological protection, such as ground impermeability, erosion control, air purification, prevention of water pollution, water purification, waste treatment/recycling, construction of storage areas, product extraction, and household sewage systems (Sheraz, 2010). The technical textile developments in the Ecotech field overlap with various areas, including industrial textiles, geotextiles, and agricultural textiles, making it difficult to define these textiles clearly at this stage.

Table 2: Summary of Technical Textile Areas and Applications

Fields of Technical Textiles	Applications
Transport Technical Textiles (Mobiltech)	Examples include airbags, parachutes, inflatable boats, hot air balloons, seat covers, seat belts, tire cord fabrics, seat upholstery, vehicle belts, textiles used in car engines and bodies, hoses, and filters. Their functions include protection, filtration, insulation, and safety.
Building and Construction Technical Textiles (Buildtech)	These are textile products used in new building constructions and building reinforcement. Examples include textile reinforcements for concrete, roofing materials, interior construction textiles, insulation, noise reduction textiles, and carbon fiber reinforcements for earthquake-resistant buildings.
Agricultural Technical Textiles (Agrotech)	Used in agriculture, forestry, fisheries, livestock farming, and horticulture. Examples include crop protection covers, bird protection nets, hail protection nets, and fishing nets.
Protective Clothing Technical Textiles (Protech)	Garments protecting against fire, cold, high voltage, radiation, chemicals, microbes, etc. Examples include cut/stab-resistant clothing, firefighter suits, antimicrobial garments, waterproof clothes, high-visibility clothing, NBC (nuclear, biological, chemical) protective gear, high-

	altitude clothing, bulletproof vests, and UV-protective garments.
Technical Components of Clothing and Footwear (Clothtech)	These textiles meet the functional requirements of garments and shoes. Examples of hidden components include interlinings, sewing threads, linings, insulation fiber fillings, and shoulder pads.
Geotextiles (Geotech)	Produced for geotechnical applications. Used in civil engineering (roads, tunnels, bridges, dams, buildings), irrigation (canals, rivers), soil insulation, and environmental engineering (landfills, waste management). Main functions include reinforcement, stabilization, separation, drainage, and filtration.
Home Technical Textiles (Hometech)	Technical textiles used inside buildings. Common examples include upholstery, mattress components, curtain and carpet tapes, dust cloths, and fiber fillings for furniture.
Industrial Technical Textiles (Indutech)	Examples include conveyor belts, seals, air/water/oil filters, electrical/electronic components, industrial composites, ropes used in transportation, ports, oil platforms, and defense sectors.
Medical Textiles (Medtech)	Examples include artificial tendons, cartilage, corneas, sutures, artificial joints/bones, vascular grafts, fabrics for heart valve repair, artificial veins, organs, bandages, surgical drapes, gauze, dressings, surgical gowns, masks, bed sheets, patient diapers, and surgical socks.
Packaging Textiles (Packtech)	Textiles used for packaging purposes. Found in agricultural, industrial, and consumer product packaging. Examples include durable papers, sacks, tea bags, and textile packaging for food and industrial goods..
Sports Technical Textiles (Sportech)	Technical textiles used for sports purposes. Examples include artificial turf, materials for flying/sailing sports, and active sports like climbing and swimming e.g., sports

	shoes, bags, sleeping bags, tent fabrics, swimwear fabrics.
Ecological and Environmental Technical Textiles (Ecotech)	Include textiles aimed at environmental and ecological protection. Examples include ground insulation fabrics, erosion control composites, air purification, water pollution prevention, water treatment/recycling, landfill construction, resource extraction, and domestic wastewater treatment facility textiles

Source: Horrock, 2004

4.Technology Groups of Technical Textiles

The technical textiles discussed in the twelve application areas mentioned by Horrocks are classified by Sheraz et al. based on technology. Sheraz et al. have identified the technology groups as fiber technology, yarn technology, fabric production technology, nanotechnology, coating technology, smart textiles, and composite technologies (Sheraz, 2010).

Sheraz et al. have identified the technology groups as fiber technology, yarn technology, fabric production technology, nanotechnology, coating technology, smart textiles, and composite technologies.

Table 3: Distribution of Technical Textiles by Technology Groups

Technology Groups	Fiber Technology
	Yarn Technology
	Fabric Production Technology
	Nano Technologies
	Coating Technology
	Composite Technologies
	Smart Textiles

Source: Sheraz vd., 2020

4.1. Fiber Technology

Fiber technology is a field that encompasses the types of fibers used in the production of technical textile products, their processing methods, and the development of higher-performance fibers and materials derived from these fibers. Technical textile products cannot be developed without specialized fibers possessing specific properties tailored to particular applications. These products are predominantly manufactured using high-performance technical fibers, making the development of new fibers essential. For example, the evolution of fibers such as carbon fiber, glass fiber, and high-density polyethylene (HDPE) stems from this necessity. Lightweight and high-strength carbon fibers are used in building reinforcements; glass fibers, which offer higher heat resistance and

are non-flammable, are commonly employed in the production of heat-resistant technical garments; and HDPE, known for its high impact resistance and chemical durability, is widely used in industrial and defense sectors. Multifunctional fiber filaments suitable for various technical applications can also be developed—for instance, metal particles blended with a polymer can impart antibacterial properties (Sheraz et al., 2020).

Various types of yarns are used for high-performance textiles, including both natural and synthetic yarns. Natural fibers possess high strength and moisture absorption properties but exhibit low elasticity and elongation. Cellulosic fibers, on the other hand, offer high elongation and moisture absorption but have low strength and elasticity. Synthetic fibers such as nylon, polypropylene, and polyester are characterized by high strength and elongation, while having low moisture absorption properties (Aldalbahi et al., 2021).

It refers to the enhancement or modification of the mechanical, chemical, or physical properties of fibers through coating or nanotechnological processes. These enhancements alter the surface characteristics of the final product, resulting in increased strength, durability, and flexibility. Through the coating process, yarns can be endowed with properties such as water resistance and heat resistance.

Fiber technology focuses on the processing of high-performance fibers and their transformation into final products. The main fiber components in fiber technology include: Natural fibers, such as cotton, wool, silk, and jute, which are derived from plant or animal sources. Synthetic fibers, such as nylon, polyester, and polypropylene, which are produced through chemical processes. These fibers are frequently used in technical textiles due to their durability, flexibility, and resistance to water. Composite fibers, including specialized fibers like carbon fiber, aramid, and glass fiber, are used in applications that require high strength, light weight, and heat resistance.

The main fiber production methods in fiber technology are as follows:

- **Spinning Process (Yarn Conversion):** Fibers are processed in spinning machines to be converted into yarn.
- **Filament and Staple Fibers:** Fibers are produced either as continuous long strands (filaments) or as short cut fibers (staple).
- **Advanced Fiber Production Methods:** These involve high-tech processes such as nanotechnology, microchannels, or integrated functionalities. For example, special processing techniques may be applied to impart properties like electrical conductivity, water resistance, or antibacterial effects

4.2. Yarn Technology

Technical yarns are produced to meet the functional requirements of final technical textile products. These include, for example, technical sewing threads and conductive yarns. Technical yarns have various applications in technical textiles and are obtained through different twisting and folding techniques. A technical yarn is produced by twisting bundles of fibers in a parallel alignment. Twisting refers to the spiral rotation applied to fibers, while folding involves wrapping two or more yarns together. This allows for the simultaneous benefit of the properties of both materials. Through these processes, strength is imparted to the fiber and yarn (Sheraz et al., 2020).

4.3. Fabric Production Technology

Unlike traditional textile products, technical textile products are fabrics designed for a specific purpose and possess functional properties. Technical textile fabric production technology generally encompasses the manufacturing process of fabrics that meet specific functional requirements. These products are typically produced using nonwoven or woven textile structures. The types of technical fabrics used and the components of fabric production technology include the following:

- Natural Fabrics:** Fabrics produced from natural fibers such as cotton, wool, and silk are used in some technical textile applications but are mostly preferred in traditional textile products.

- Synthetic Fabrics:** Fabrics made from synthetic fibers such as polyester, nylon, and polypropylene are widely used in technical textile fields due to their high durability and flexibility. These fabrics are especially preferred in products that require strength and long service life.

- Composite Fabrics:** Fabrics made from special materials such as carbon fiber, glass fiber, and aramid are used in industries that require properties like lightness, heat resistance, and high strength.

- Functional Fabrics:** Fabrics with functional properties such as smart textiles, electronically conductive fabrics, and antibacterial fabrics are commonly used in wearable technology and the medical sector.

- Weaving:** This method involves interlacing warp yarns (running lengthwise) and weft yarns (running crosswise) at right angles to form a fabric. In technical textile applications, woven fabrics are preferred especially in products where durability is a key requirement. Narrow weaving techniques are commonly used in the automotive sector to produce fabrics for applications such as seat belts and engine component protection.

• **Knitting:** This refers to the fabric structure created by interlooping yarns. While weaving and weft knitting are the most commonly used techniques in traditional textiles, **warp knitting** is predominantly used in technical textile products. Warp-knitted fabrics offer better dimensional stability compared to weft-knitted ones. Unlike the high durability of woven fabrics, knitted fabrics exhibit greater flexibility. Therefore, the knitting method is commonly applied in sportswear and medical technical textile products.

• **Nonwoven (Felt) Fabrics:** These types of fabrics are obtained by combining yarns with thermal, chemical or mechanical methods. Other techniques used are nonwoven fabric technique, knitting, three-dimensional weaving (3D weaving) technique. Nonwoven fabric production provides high production speed and low cost. Synthetic fibers are used in the production of products produced with the nonwoven fabric technique. Products produced with this technique can be used for absorbency, filtering, insulation and packaging purposes. The knitting technique is a technique in which multiple strands of yarn are intertwined to form a cord. Knits are made using almost any type of fiber (cotton, polyester, jute, Kevlar, etc.). Three-dimensional weaving (3D weaving) is a weaving technique used in composite materials (Sheraz et al., 2020). It is generally used in disposable products, filtration materials and medical applications.

4.4. Nano Technologies

Nanotechnology is a field focused on the engineering of materials at the atomic and molecular scale. "Nano" refers to one-billionth of a physical quantity, and through this nanometer scale, it is possible to create nanomaterials with various advanced properties, such as conductivity, durability, atomic structure, color, flexibility, and reactivity, without altering their chemical properties. Nanotechnology aims to engineer the fundamental structure of materials at the atomic and molecular level, either to enhance the added value and performance of existing products or to introduce new functionalities (Renn & Roco, 2006, 153).

Nanotechnology applications in textiles are discussed in two ways (Cireli et al., 2006):

- **Producing new textile materials at the nanoscale**, such as nanofibers, nanotubes, and nanocomposites, with different functions.
- **Enhancing the existing functions and performance** of textile materials through nanotechnology applications.

These developments can be achieved in two ways:

- **Adding nanoparticles, nanocomposites, etc.,** to the fiber, yarn, or fabric surface to impart different properties.
- **Altering the positions of atoms and molecules** and using advanced technologies (such as plasma, sol-gel, etc.) to apply coatings and create new or functional surface layers

Nanotechnological research in the textile industry results in fabrics with various advanced properties, including stain resistance, dirt repellency, odor control, wrinkle resistance, flame retardancy, anti-wrinkle, water repellency finishes, moisture management, antimicrobial effects, UV protection (Laschuk et al., 2008), temperature control, heat and moisture sensitivity, color-changing capabilities, and even the ability to store and transmit data. These features are incorporated into fabrics using nanotechnology. The applications of nanotechnology in the textile industry include the use of nanofibers in fiber production and the use of nanoparticles in textile finishing processes (Maity and Chatterjee, 2013).

Gulati et al. (2021) discussed the production of antimicrobial textiles in healthcare and sportswear, while Harifi and Montazer (2017) focused on waterproof, antibacterial properties, UV protection, self-cleaning, temperature regulation, and circulation-supporting nanotechnology textiles in sportswear and sports shoes. In their study, Mejia et al. (2017) reported a reduction in microorganisms by applying metal nanoparticles to textiles for hospital environments.

Another area of application for nanotechnology is smart clothing and wearable technologies equipped with electronic functions. These garments have the capability to generate energy due to their electronic features. Natural fibers do not have the ability to conduct electricity, but with the help of nanotechnology, innovative work on textile materials with conductive properties has gained attention (Coşkun, 2007). The initial applications involved incorporating nano-thinned metallic strips into fabrics through weaving techniques, thereby providing the fabric with the necessary electrical properties. The conductivity of the fabric can be controlled depending on the diameter and density of the metallic strips. However, this conductivity is not permanent and may disappear with fabric cutting. Research continues to ensure continuous conductivity and the production of fabrics that can transmit electricity (Vassiliadis et al., 2004).

4.5. Coating Technology

In textile terminology, coating refers to the process of applying a viscous formulation onto a fabric and bonding it. Laminating, on the other hand, is the

process in which a single or double-sided adhesive polymer layer is bonded to the fabric using heat or pressure, transforming it into a single piece. Both techniques result in the creation of new textile products that differ from the original fabric in terms of properties and durability. Through these processes, new composite textile materials are created, offering enhanced features that make them suitable for different applications (Akova, 2012; Sen, 2008).

In coating technology, a coating material can be applied to one or both surfaces of the fabric. For example, in life jacket production, the coating material can be applied between two layers of fabric (Schwartz, 2004). Various methods, such as spraying, transfer printing, washing, rinsing, and padding, can be used to apply coatings to fabrics (Asif et al., 2018). The most commonly used technique is the knife method for spreading the coating material onto the fabric. In this method, the fabric passes beneath an inclined knife. The coating material is applied to the fabric using this technique, and as the fabric passes under the knife, pressure is applied to the underlying layer, allowing the coating material to penetrate into it (Sheraz et al., 2020). In the coating technique, parameters such as the density and amount of the polymer to be applied as the coating material, the coating technique to be used, the structure of the knife, the angle between the knife and fabric, and the fabric's speed under the knife, determine the unique characteristics of the resulting composite material (Latta, 1982).

This process aims to add performance or functional features to the fabric and expand its areas of use. Through the coating material, the final product gains properties such as increased tensile and tear strength, water resistance, thermal insulation, and enhanced resistance to chemical and environmental factors. Other properties that can be imparted include water repellency, dirt resistance, wrinkle resistance, anti-bacterial, anti-static, UV protection, flame retardancy, and improved dyeability (Akova, 2012; Schwartz, 2004).

It is demonstrated that technical textiles with reduced or eliminated permeability properties, achieved through lamination and coating techniques, have created numerous applications ranging from the defense industry to home textiles. Some of the final products produced with coating technology include textile products used in construction, airbag applications, carpet backings, automotive interior upholstery, as well as high-tech products such as protective or camouflage clothing, and conductive polymer-coated fabrics (Bulut and Sölar, 2010).

4.6. Composite Technologies

Composite technologies, also known as composite materials, are a significant advancement in material science, involving the combination of two or more materials with different physical or chemical properties to create a new material

with enhanced performance characteristics. This combination allows for the creation of materials that possess the advantages of each component, resulting in superior properties such as increased strength, durability, and lightness. The resulting composite materials often consist of two main components: reinforcement and resin. The reinforcement materials, such as glass, carbon fibers, or aramid fibers, are responsible for providing mechanical strength and stiffness to the material, while resins like epoxy or polyester serve as a matrix that binds the reinforcement and gives the material its shape and form after curing. These composite materials are often customized for specific applications based on the needs of the final product, such as aerospace components, automotive parts, or sports equipment, where high strength-to-weight ratios are essential. The selection of materials used in the composite, such as high-performance fibers like carbon, can significantly influence the cost of production. While composites are generally lightweight and durable, the performance characteristics and price vary according to the materials chosen and the specific requirements of the application, making them highly versatile and useful in industries requiring specialized, high-performance materials (Sheraz et al., 2020).

4.7. Smart Textiles

Smart textiles are fabrics capable of sensing environmental stimuli and responding to them. Both the stimuli and the responses can originate from electrical, thermal, chemical, magnetic, or other sources (Langenhove et al., 2004). A common example is textiles that detect ambient temperature and change color accordingly.

Smart textiles interact with their surroundings by perceiving environmental conditions. What distinguishes smart textiles from technical textiles is their ability to respond to external stimuli. Advanced materials such as breathable, fire-resistant, or ultra-strong fabrics—often discussed under the umbrella of nanotechnology—are not considered smart according to this definition, regardless of their technological sophistication. In other words, smart textiles are those that can sense and react to stimuli from their environment.

The literature on examples of smart textiles used in the field includes the following studies: The Massachusetts Institute of Technology (2023) reports the development of combat uniforms that, through nanotextile innovations in the military sector, provide protection against chemical and biological attacks, regulate body temperature by monitoring bodily functions, heal wounds, and stop bleeding. Riley and Cork (2018) discuss the production of textiles incorporating information technology through the integration of electronics into fabrics, enabling functions such as sensing, lighting, temperature control, and the storage or transmission of data. İşmal and Yüksel (2016), in their study on the use of nanotechnology in fashion and clothing design, highlight the use of color-

changing chromic materials in textiles for fashion and decorative purposes. Kut and Güneşoğlu (2005) examine military applications of nanotextiles, such as the use of phase-change materials and fabrics that tighten to provide support in case of fractures..

Another application area involves technical textiles that support and enhance energy generation through the use of photovoltaic (solar energy) materials. Photovoltaic textile materials, which convert sunlight into electrical energy, can generate energy at varying capacities and are used in a variety of contexts. Examples include solar-powered tents, umbrellas, bags, sports equipment, smart roofing systems, photovoltaic nets used in agricultural fields and greenhouses, and building facade coverings. These materials typically possess special properties such as high conductivity, durability, flexibility, and resistance to environmental effects (Bedeloğlu et al., 2010).

5. Results and Evaluations

Technical textile materials have become an indispensable component for many industries. These materials are not only supportive but are also considered strategic elements that directly impact the functionality and safety of the product. Used in various fields ranging from aerospace to automotive, construction to the energy sector, these materials help reduce production costs while contributing to environmental sustainability. Particularly, their lightweight structures provide environmental benefits such as fuel savings and emission reduction, further increasing the importance of these materials..

Recyclable materials and energy-saving production systems developed in line with the principles of environmental sustainability are making the technical textile industry more efficient both environmentally and economically. Furthermore, technical textiles that enhance structural durability in earthquake resistance are also playing a critical role in reducing disaster risks that directly affect human lives.

The shift of developed countries toward maintaining industrial superiority and developing countries toward creating new economic opportunities through the technical textile field highlights the global strategic importance of the sector. In light of these developments, it is anticipated that investments in the technical textile sector will not only increase production capacity but also play a critical role in enhancing global competitiveness. Specifically, support for R&D activities will accelerate new material development processes and enable technical textiles to expand into a broader range of applications. In this regard, public policies, industry collaborations, and university-industry integration are crucial for the sustainable growth of the sector.

As a result, technical textiles are not merely materials but strategic tools that shape the future of industrial production. With the high performance, energy efficiency, and environmental compatibility they offer, technical textiles have become defining elements, rather than complementary ones, in production processes. Particularly in sectors with high material consumption, such as automotive, aerospace, and construction, they provide significant advantages in terms of both economic and ecological sustainability. Therefore, the development of technical textile technologies progresses not only with innovations in material science but also in parallel with industrial transformation, resource efficiency, and safe production goals. All of these developments point to the fact that the progress in the technical textile field will be one of the key components of sustainable development.

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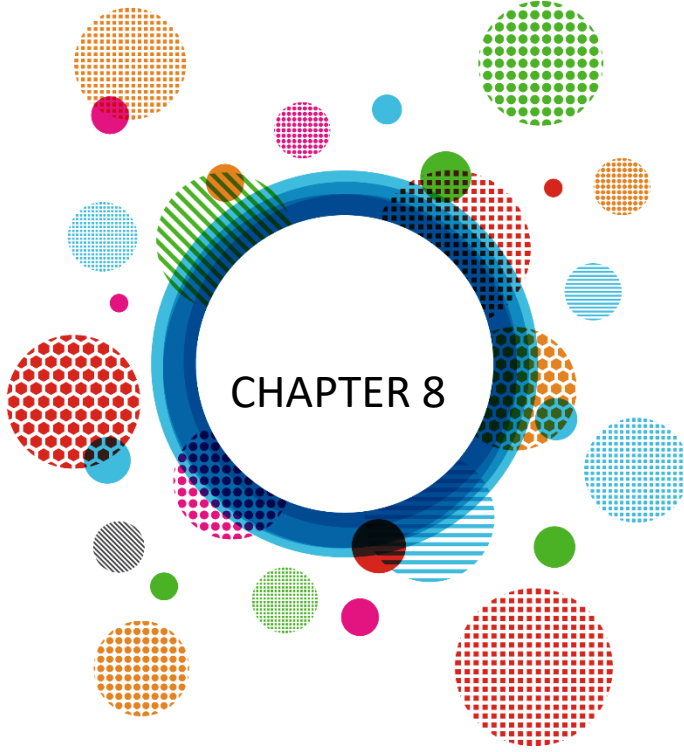
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Barriers to Ethical Consumption: The Case of Animal Testing in The Beauty Industry

Mehmet Özer Demir¹ & Ali Rıza Aktaş²

¹ Doç. Dr., Alanya Alaaddin Keykubat University, ORCID: 0000-0002-5035-0530

² Doç. Dr., Muğla Sıtkı Koçman University, ORCID: 0000-0003-4964-7334

Introduction

Ethical consumption encompasses a broad spectrum of consumer behaviors that are informed by a concern for the ethical implications of purchasing decisions. These behaviors may include choosing products that are environmentally friendly, produced under fair labor conditions, or contribute to social welfare (Lee, 2017; Thabet Muhammad & Al-Dabbagh, 2023). Ethical consumption is not only a personal choice but also a cultural phenomenon that can influence the behaviors of others and contribute to the formation of an ethical consumption culture (Lee, 2017). Interestingly, while there is a growing trend towards ethical consumption, there is a discrepancy between consumers' stated preferences and their actual purchasing behavior. For instance, consumers often express a willingness to purchase environmentally conscious products, yet global purchasing patterns do not always align with these sentiments (Tsarenko et al., 2013). Additionally, the impact of ethical consumption on the restoration of ecosystem services in tourism highlights the complexity of integrating ethical considerations into consumer behavior and decision-making processes (Kipkosgei, 2022). In summary, ethical consumption is a multifaceted concept that reflects consumers' values and the influence of cultural norms. It has the potential to drive significant positive change in various sectors, including tourism, fashion, and food production. However, there is a need for increased awareness and education to bridge the gap between consumers' ethical intentions and their actual purchasing habits. Efforts to promote ethical consumption should consider the role of external influences, such as retailers and brands, and the importance of integrating ethical considerations into business practices and consumer education (Kipkosgei, 2022; Lorek, 2020; Thabet Muhammad & Al-Dabbagh, 2023).

In recent years, the significant rise in interest in ethical consumption has attracted substantial attention from both academic researchers and industry professionals (Montagnini et al., 2016). This global trend reflects a shift in consumer priorities, as individuals increasingly consider the social and environmental impacts of their purchases. The cosmetics industry, in particular, has seen a notable surge in demand for cruelty-free products due to heightened concerns about animal testing (Ghazali et al., 2017). Despite the growing market for ethically produced cosmetics, there remains a need for a deeper understanding of the factors that drive consumer behavior in this domain.

This study aims to fill this gap by examining how ethical concerns, specifically regarding animal testing, influence consumer behavior in the cosmetics industry. Utilizing the Situational Theory of Publics (STP), Value-Based Norms (VBN), and the Theory of Planned Behavior (TPB), this research provides a comprehensive analysis of the predictors of ethical consumption. By

integrating these theoretical frameworks, the study seeks to offer valuable insights for both academic inquiry and practical application in marketing strategies.

The following sections of this paper will detail the relevant literature on ethical consumption, outline the theoretical frameworks guiding this research, describe the methodology employed, present the results of the empirical analysis, and discuss the implications of these findings for theory and practice.

In recent years, the significant rise in interest in ethical consumption has attracted substantial attention from both academic researchers and industry professionals (Montagnini et al., 2016). The fact that ethical consumption is on the agenda shows that global concerns and responsibility awareness are important issues for consumers. Consumers are increasingly cautious with their product choices, considering moral factors and showing a willingness to pay more for goods or services with ethical attributes (Amalia & Darmawan, 2023). Products and services that do not cruelty to animals, have reduced environmental impact, and do not exploit workers are preferred by ethical consumers (Oh & Yoon, 2014). Increasing demand for ethical consumption leads to an increase in demand for environmentally friendly products (Chi, 2022). It can be said that this trend has also affected the cosmetics sector. As the entire product chain has become more transparent, the production methods of cosmetic products have started to be questioned by consumers. People are affected by different factors in their preference and purchase intention of cosmetic products. The quality and safety of cosmetic products have become a critical issue for customers' purchasing preferences and the ecological footprint of these products. For instance, unsustainable sourcing of raw materials or laboratory tests on animals are factors that modern society takes into account.

Customer expectations such as the reliability of a brand, and safe consumption for both human health and ecological health have raised the voice of manufacturers to favor organic and green cosmetics (Ghazali et al., 2017). Furthermore, animal welfare is a vital responsibility of ethical customers. Historically, many brands tested their products on animals using injection procedures or chemical exposure to ensure human safety. Fortunately, growing awareness has led to the rise of cruelty-free brands. The cruelty-free label denotes products or practices that avoid animal testing. In addition to preventing animal testing, these products offer several environmental benefits, including reduced chemical usage and a lower carbon footprint (Amalia & Darmawan, 2023). Focusing on the intention to purchase cruelty-free cosmetics, the paper investigates cosmetic product users in the context of the Situational Theory of Publics (STP).

The STP predicts the behavioral effects of communication, as well as the attitudes that are most commonly associated with particular types of communication and types of publics where these outcomes are most likely. In this study, based on the STP, the purchase intention and purchase behavior of cosmetic product users were investigated, using the norm as a mediating factor. The research model is formed as problem recognition, constraint recognition, involvement, and reference criterion which are variables of the STP that will affect norms and as a result, lead to changes in purchase intention and purchase behavior. Thus, the paper aims to investigate the purchasing intentions of cosmetic product users regarding animal testing, utilizing the STP as a framework. By incorporating the Value-Based Norms (VBN) and the Theory of Planned Behavior (TPB), the paper constructed a comprehensive model to explain how different factors impact consumer buying behavior concerning cosmetics tested on animals. Integrating VBN and TPB with STP allows for a more nuanced understanding of the factors driving ethical consumer behavior. These theories collectively inform our hypotheses and guide the empirical analysis conducted in this study.

Understanding consumer behavior in the context of ethical consumption necessitates a theoretical framework. The Situational Theory of Publics (STP) offers such a framework by segmenting the public based on their problem recognition and involvement with societal issues. To understand the complexities of ethical consumer behavior, it is essential to explore relevant theoretical frameworks. The following literature review examines the Situational Theory of Publics (STP), Value-Based Norms (VBN), and the Theory of Planned Behavior (TPB), providing a comprehensive foundation for the study.

Situational theory of publics

The strategic role of public relations lies in defining and understanding an organization's environment, which is the total of all the conditions and forces that influence an organization's strategic choices but are typically beyond its control (Kim et al., 2008). Identifying the publics, which is one of the strategic components of the organization's environment and which help or restrict the organization in achieving its goals, is a critical process in understanding the environment. Grunig and Repper (1992) stated that the main role of public relations is to identify and segment the public and defined segmentation as grouping people in a population in a homogenous way. Since each segment of the public has a different orientation towards the organization, their communication expectations from the organization are different. Therefore, through the segmentation of the publics, an organization can strategically respond to issues by building its relationship with each public segment through different

communication strategies (Berkowitz & Turnmire, 1994) and effectively manage the issue and relationship (Hong et al., 2012).

Grunig (1978) offered the STP for the segmentation of publics within the framework of strategic public relations management. Borrowed from market segmentation theory, the STP is the first discipline-specific theory of public relations (Aldoory & Sha, 2007). This theory is a tool that segments strategic publics that are important for the organization to develop effective relationships and to plan different communication strategies with publics whose communication behaviors are ranked from active to passive. At this point, a public is defined as a homogeneous group that perceives and confronts a specific problem and organizes for action. The theory identifies situations where a group of unconnected individuals develops into an activist group and the publics develop that influences organizational decisions. The main purpose of the theory is to predict public reaction to certain issues and problems (Grunig, 1978, 1983; Grunig & Hunt, 1984; Grunig & Repper, 1992).

The STP is a well-tested theory to explain the relationship between public opinion and communication behaviors (Kim & Krishna, 2016; Major, 1993). It has been studied in various contexts such as health-related social issues (Aldoory & Bonzo, 2005; Cameron & Yang, 2016), banking (Gök Demir & Conteh, 2021), politics (Chen, 2020; Hamilton, 1992), environment (Grunig, 1983; Major, 1993), risks (Aldoory et al., 2010; Grunig & Ipes, 1983; Lee & Rodriguez, 2008; Major, 1998), and cultural identity (Sha, 2006).

The STP is based on the assumption that publics gather around certain problems, situations, or issues, therefore, the key concept for public formation is the problem (Grunig & Repper, 1992). Problems created from organizational actions, outputs, and decisions, i.e. organizational outcomes, are perceived by the publics and disappear as they are solved. Therefore, the problems perceived by the publics are situational (Kim et al., 2008).

A problem is a necessary condition, but not sufficient, for the public to fulfill its duty to solve the problem. The public may be experiencing a serious consequence but may not engage in any problem-solving activity due to a lack of interest in the problem or perceived constraints (time, resources, information). Therefore, the STP uses three independent variables; problem recognition, constraint recognition, and involvement, and two dependent variables; information processing and information seeking to predict the publics' communication behavior, attitude change, and behavior change (Grunig, 1978, 1983, 1989, 1997b; Grunig & Hunt, 1984; Grunig & Ipes, 1983; Grunig et al., 1988; Grunig & Stamm, 1979).

The theory assumes that people actively seek extra information when they perceive a problem, (Grunig, 1983, 1997a), therefore, the first variable is named problem recognition. Indeed, Major (1993) found that the likelihood of communication increases with problem recognition, such that information seeking and information processing between people faced with a problem is likely to occur even if the level of involvement is low. Involvement is a measure of how personally interested an individual is in a problem (Grunig & Hunt, 1984). Involvement, which is also defined as a perceived emotional connection or relationship, increases the likelihood that individuals comprehend and pay attention to messages (Pavlik, 1988). If a person is personally interested in a topic or a message, he/she will probably comprehend it better or be more attentive to it if it affects his/her life (Aldoory et al., 2010; Grunig & Hunt, 1984; Pavlik, 1988).

People with a high level of involvement analyze the topic more often, prefer messages with more and better arguments (Heath et al., 1995), and have more information (Chaffee & Roser, 1986; Engelberg et al., 1995). Moreover, high involvement may lead to active information seeking (Hallahan, 2000; Lee & Rodriguez, 2008). Finally, constraint recognition is the extent to which individuals perceive factors that limit their ability to act or change behavior. These restrictive political, economic, or physical factors weaken the individual's belief in what he/she can individually do about the issue. Therefore, perceived high constraint tends to reduce communication (Grunig, 1983; Grunig & Repper, 1992; Stamm & Grunig, 1977).

Additionally, Grunig (1997b) conceptualized of a referent criterion but had to exclude it because research on referent criterion within the situational theory framework has yielded inconsistent findings (Kim & Grunig, 2011, p. 122). While in some instances, previous experience or knowledge about a problem serves as a predictive factor for other theoretical variables (Gök Demir & Conteh, 2021), in other cases, the reference criterion's predictive capacity remains limited. However, studies have shed light on the need to re-articulate this variable. A referent criterion, as initially defined by Grunig (1968), is influenced by an individual's social contacts and past behavior. It encompasses any information, knowledge, or subjective judgment that effects how a public deal with a problem (Kim & Grunig, 2011). Primarily cognitive, it relies on relevant knowledge (Higgins, 1996). The existence of a referent criterion is expected to significantly improve communicative actions in problem-solving (Kim et al., 2012). Thus, this paper integrates all four independent variables of the theory to investigate the purchasing behavior of cosmetic products that do not use test animals.

The Situational Theory of Publics (STP) offers a valuable lens through which to segment consumers based on their problem recognition and involvement in

ethical issues. This segmentation is crucial for addressing our research aims of understanding consumer behavior in the ethical cosmetics market.

Indigenous variables

Public relations (PR) are a strategic communication process that builds mutually beneficial between organizations and theirs. It is crucial for managing reputation, disseminating information, and engaging with various stakeholders (Agu et al., 2022). PR theories, such as the Situational Theory of Publics (STP), provide frameworks for understanding and predicting the behaviors of different publics, which is essential for effective communication strategies.

The STP, a foundational theory in PR, posits that publics can be identified and segmented based on their levels of problem recognition, constraint recognition, and involvement in a particular issue (Kim & Krishna, 2014). It suggests that individuals' communication behaviors are influenced by their perception of a problem and their belief in their ability to affect the situation. The Situational Theory of Problem Solving (STOPS) extends this framework by examining the antecedents of individuals' communication behaviors in problem-solving processes (Kim & Krishna, 2014; Kim & Ni, 2013).

Interestingly, while STP focuses on the identification of publics and their information behaviors, it does not prescribe specific message content. This gap is addressed by combining STP with other theories, such as Symbolic Convergence Theory (SCT), to form a Homo Narrans paradigm that guides both the targeting of publics and the crafting of message content (Vasquez, 1993).

In summary, public relations is vital for fostering constructive interactions between organizations and their publics. The Situational Theory of Publics is instrumental in identifying and understanding these publics, thereby informing targeted communication efforts. The theory's extension, STOPS, further elucidates the communication dynamics involved in problem-solving, enhancing the applicability of STP in various contexts, including crisis management and intercultural relations (Ni & Sha, 2023).

The Theory of Planned Behavior (TPB) and value-based norms are indeed instrumental in understanding the predictors of ethical consumer behavior, which aligns with the Situational Theory of Publics (STP). TPB, with its focus on intention as a precursor to action, is enhanced by incorporating value-based norms such as moral identity and environmental concern, which are significant predictors of ethical consumer behavior (Hossain et al., 2022; Sun, 2020). These norms act as additional determinants that influence the intention and behavior of consumers, particularly in ethical and environmentally conscious contexts. Interestingly, while TPB is a robust framework, it has been noted that its explanatory power can be limited when not accounting for the broader set of

values and norms that drive consumer behavior. For instance, the inclusion of moral norms and environmental concern has been shown to significantly influence purchase intentions for energy-efficient appliances, suggesting that these value-based norms are critical in shaping ethical consumer decisions (Hossain et al., 2022). Moreover, cultural factors such as collectivism have been found to moderate the relationship between environmentally conscious consumer behavior and its predictors, indicating that value-based norms are not only internal but can also be influenced by external cultural contexts (Ghali-Zinoubi, 2022). In summary, the integration of value-based norms into the TPB framework complements the Situational Theory of Publics by providing a more comprehensive understanding of the factors that predict ethical consumer behavior. This synergy allows for a deeper insight into how attitudes, subjective norms, perceived behavioral control, and value-based norms such as moral identity and environmental concern interact to shape consumer intentions and actions (Ghali-Zinoubi, 2022; Sun, 2020).

Value-based Norms (VBN) center on moral values and norms. Norms represent informal rules that dictate appropriate or inappropriate actions in specific situations (Nyborg, 2003). Personal norms influence individual choices regarding pro-environmental actions, driven by a sense of internal obligation to act in specific ways. Norms are activated when individuals believe that violating them could have negative consequences on valued outcomes. In the literature, norms are clearly defined, including descriptive norms, subjective social norms, and personal norms, extensively used to study various intentions and behaviors, including purchasing decisions. According to the Theory of Planned Behavior (TPB) (Ajzen, 1991), purchasing behavior is influenced by intentions to purchase a product, shaped by attitudes toward the purchase, subjective norms, and perceived control over consumer actions. The TPB has been successful in explaining approximately 40% of the variance in intention (Rivis et al., 2009). Studies have focused on explaining the remaining variance by incorporating additional normative variables into the TPB model, emphasizing moral norms (Rivis et al., 2009), social norms (Nyborg, 2003), personal norms (Harland et al., 1999), and descriptive norms (Manning, 2009).

Environmentally responsible behavior is positively associated with both subjective social norms and personal norms (Bamberg & Schmidt, 2003). Empirical evidence suggests that personal norms strongly influence environmentally responsible behavior, with social pressure playing a less significant role. The strength of the norm construct correlates with behavior regulation; constructs in the norm taxonomy are likely correlated with behavior if they regulate individual behavior (Thøgersen, 2006).

Thus, the paper proposes a conceptual model (Figure 1), integrating the STOPS, VBN, and TRB to explain the purchasing behavior of cosmetic products that do not use test animals.

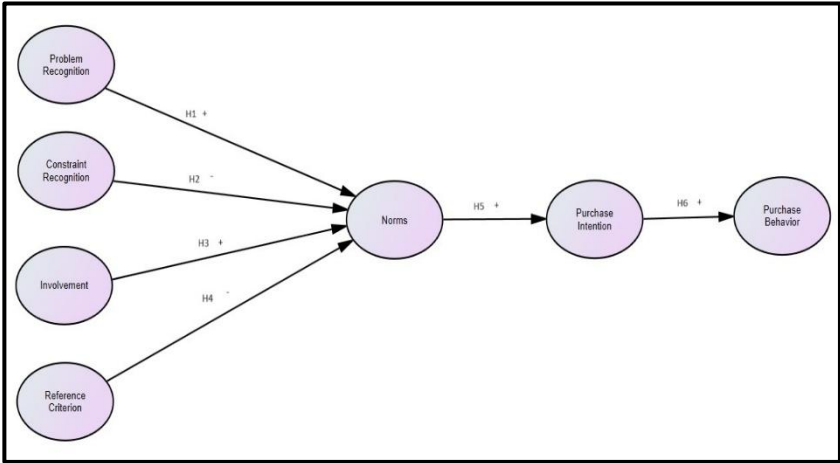


Figure 1 Conceptual model

The conceptual model proposes that problem recognition, constraint recognition, involvement, and reference criterion are exogenous variables. Every one-headed arrow represents a hypothesis, suggesting that

H1: There is a positive relationship between problem recognition and norms.

H2: There is a negative relationship between constraint recognition and norms.

H3: There is a positive relationship between involvement and norms.

H4: There is a positive relationship between reference criterion and norms.

H5: There is a positive relationship between norms and purchase intention.

H6: There is a positive relationship between norms and purchase behavior.

The paper suggests that consumer norms are influenced by several factors: recognition of issues related to animal use in cosmetic testing, perceived constraints inhibiting action regarding such testing, personal involvement in or exposure to these practices, and familiarity with appropriate behavior based on prior experiences (reference criterion). These norms subsequently influence consumer purchase intentions, which in turn impact purchase behavior.

Situational theory of publics

Population and sample of the study

The study population includes individuals who buy cosmetic products. The sample comprises individuals who voluntarily took part in an online survey during a specific timeframe. Although, according to the literature on sample size, it's recognized that having 384 participants at a 95% confidence level is adequate, the study sample comprised 418 participants. The sampling method used was non-probabilistic, specifically an online survey.

Data collection

The data collection tool includes problem recognition (7), constraint recognition (4), involvement (5), reference criterion (6), norm (3), purchase intention (4), and purchase behavior (3), a total of 32 items. Items are adapted from (Gök Demir & Conteh, 2021). The questionnaire employs a 7-point Likert scale, where 1 represents "Strongly Disagree" and 7 indicates "Strongly Agree".

Validity and reliability tests

The paper employs a structural equation modeling approach; thus, confirmatory factor analysis (CFA) is operationalized to ensure validity and reliability. AMOS script developed by (Gaskin et al., 2023) is used for the CFA. Construct Reliability (Cruz & Billanes) values are calculated for reliability tests (Table 1). The minimum CR value calculated is 0,686 and the maximum is 0,925. Although the cutoff point for a reliable scale is 0,70 and the Norm factor is just below the cutoff value, the scale is accepted as reliable(Fornell & Larcker, 1981).

Table 1 Validity analysis

	CR
Problem Recognition	0.925
Constraint Recognition	0.873
Involvement	0.886
Reference Criterion	0.863
Purchase Intention	0.877
Norm	0.686
Purchase Behavior	0.764

AVE is a strict measure of validity(Mallhotra, 2021), HTMT values are calculated for the scales used in the study take the highest value of 0,648. According to the results of the HTMT analysis (Table 2), it is seen that the scale

used in the study meets the validity conditions, the scale is accepted as reliable and valid. The CFA model suggests acceptable goodness of fit indices ($\chi^2=1199,569$, $df=443$, $\chi^2/df=2,708$, $CFI=0,913$, $SRMR=0,074$, and $RMSEA=0,064$) (Table 3).

Table 2 HTMT analysis

	ProR	ConR	Inv	RefC	PurInt	Norm	PurBeh
ProR							
ConR	0.65						
Inv	0.490	0.530					
RefC	0.446	0.559	0.648				
PurInt	0.525	0.367	0.505	0.538			
Norm	0.215	0.196	0.194	0.208	0.331		
PurBeh	0.427	0.432	0.522	0.573	0.742	0.480	

*ProR:Problem Recognition; ConR: Constraint Recognition; Inv: Involvement; RefC: Referent Criterion;
PurInt: Purchase Intention; Norm: Norms; PurBeh: Purchase Behavior

Table 3 Model fit measures

Measure	Estimate	Threshold	Interpretation
CMIN	1 199.569	--	--
DF	443.000	--	--
CMIN/DF	2.708	Between 1 and 3	Excellent
CFI	0.913	>0.95	Acceptable
SRMR	0.074	<0.08	Excellent
RMSEA	0.064	<0.06	Acceptable

Path analysis

To test the hypothesis, path analysis is conducted (Figure 2). AMOS script plugin developed by Gaskin et al. (2022) is used. The standardized path coefficients evaluated as hypothesis tests were found to be statistically significant for all relationships, except for the relationship between Constraint Recognition and Norm (Table 4).

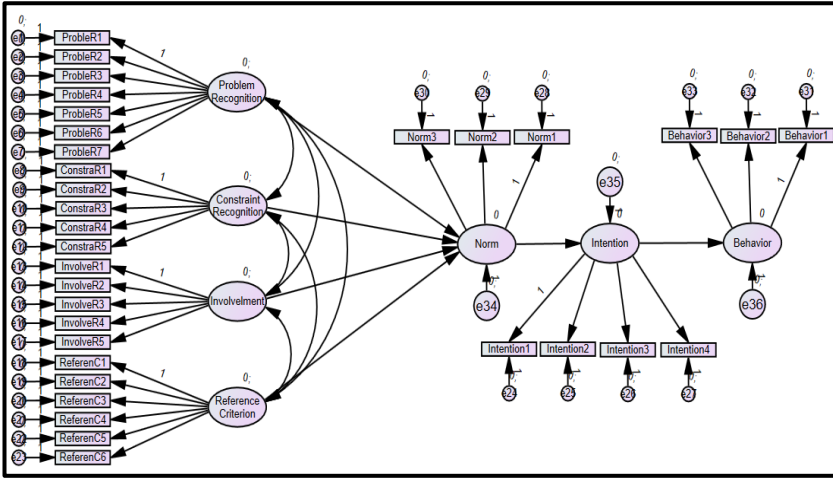


Figure 2 Empirically tested model

According to the standardized path coefficients, problem recognition has a statistically significant positive effect on Norm (str. $\beta = 0,324$, $p < 0,001$) (H1 Accepted), involvement has a statistically significant positive effect on Norm (str. $\beta = 0,224$, $p < 0,01$) (H3 Accepted), and reference criterion has a statistically significant positive effect on Norm (str. $\beta = 0,376$, $p < 0,001$) (H4 Accepted). In addition, there is a statistically significant positive effect between Norm and Purchase Intention (str. $\beta = 0,989$, $p < 0,001$) (H5 Accepted) and a statistically significant positive effect between Purchase Intention and Purchase Behavior (str. $\beta = 0,961$, $p < 0,001$) (H6 Accepted). There is no statistically significant relationship between Constraint Recognition and Norm (str. $\beta = -0,054$, $p > 0,05$) (H2 Rejected).

Table 4 Standardized regression weights

Predictor	Outcome	Std Beta
Problem Recognition	Norm	.324 ***
Constraint Recognition	Norm	- .054
Involvement	Norm	.224 **
Reference Criterion	Norm	.376 ***
Norm	Purchase Intention	.989 ***
Purchase Intention	Purchase Behavior	.961 ***

** $p < 0,01$, *** $p < 0,001$

The goodness of fit indices suggests an acceptable model, $\chi^2=1213,323$, $df=479,000$, $\chi^2/df=2,533$, CFI=0,916, SRMR=0,079, and RMSEA=0,061 (Table 5).

Table 5 Model fit measures

Measure	Estimate	Threshold	Interpretation
CMIN	1 213.323	--	--
DF	479.000	--	--
CMIN/DF	2.533	Between 1 and 3	Excellent
CFI	0.916	>0.95	Acceptable
SRMR	0.079	<0.08	Excellent
RMSEA	0.061	<0.06	Acceptable
PClose	0.000	>0.05	Not Estimated

Results

The results of the path analysis suggest a positive relationship between Problem Recognition and Norm. However, there is no statistically significant relationship between Constraint Recognition and Norm, although the relationship is negative, as hypothesized. There is a statistically significant positive relationship between Involvement and Norm. Additionally, a statistically significant positive relationship is observed between the Reference Criterion and Norm. Moreover, Norm is found to have a statistically significant positive relationship with Purchase Intention. Finally, Purchase Intention exhibits a statistically significant positive relationship with Purchase Behavior.

The findings indicate that consumers' purchase behavior regarding cosmetic products tested on animals is influenced by their purchase intentions. In turn, purchase intentions are shaped by Norms, which are affected by Problem Recognition, Involvement, and the Reference Criterion. Specifically, the more consumers recognize animal testing as a significant issue, engage with cosmetic products tested on animals, and acquire knowledge based on prior experiences, the stronger their normative beliefs become. These norms ultimately shape consumers' purchase intentions regarding animal-tested cosmetic products and subsequently influence their purchasing decisions.

Discussion

The underlying issue of how to effectively engage consumers to create a sensitive against cruelty-free products remains nebulous. To address this significant gap, this study provided empirical support on how some perceptual

and situational factors (e.g. problem recognition, constraint recognition, involvement, motivation for problem solving) could serve as antecedents for eliciting consumer engagement on animal testing using cosmetic products. Particularly, this study applied the STP, by integrating the VBN and the Theory of TPB, examination of the causal links among the variables in the STP model and found that the purchasing behaviors acted as an immediate consequence of intention to purchase cruelty free products, which is affected by norms. Results demonstrated that situational motivation plays central roles in problem solving on cruelty free product purchase intentions.

The findings confirm that problem recognition, involvement, and reference criteria significantly impact consumer norms, which in turn influence purchase intentions and actual purchase behavior. Notably, the hypothesized negative relationship between constraint recognition and norms was not supported. This suggests that perceived barriers do not significantly deter consumers from forming ethical norms against animal testing, which implies that other factors such as problem recognition, involvement and referent criterion are more critical in shaping consumer attitudes and behaviors.

Liu et al. (2019) indicated that STOPS is internally consistent and accurate at measuring its intended outcomes of communicative action in problem solving. However, the STOPS measures do not have a significant relationship with the desirable outcome for imminent threat crisis communication: individuals following government's protective action guidance about tornadoes.

A previous study applied a situational approach to understanding an environmental problem found that problem recognition, constraint recognition, and involvement recognition did not influence environmental engagement directly, but exerted their significant indirect impact via two key mediators in the model: situational motivation in problem solving and communicative action in problem solving (Jiang et al., 2019).

Shim et al. (2023) proposed a model of publics' ethical activism (climate change and anti-racism), testing the role of emotional outrage in an extended framework of the previously established STOPS model, investigating how ethical perception of a social issue affects situational motivation that leads to participation in public activism, and how emotional outrage plays a role in mediating between situational motivation and activism behaviors. Emotional outrage is modelled as a mediator between situational motivation and activism behaviors, where this paper used norms. They found that people who perceive an ethical issue are likely to be motivated to participate in activism behaviors. Specifically, three situational perceptions (i.e. problem recognition, constraint recognition and involvement recognition) were found to be significant factors affecting situational motivation in problem solving. However, this paper found

no significant relationship for constraint recognition. A high level of norm was found to play a mediating role between situational motivation and consequential ethical activism behaviors. The more people form norms about an ethical issue, the more likely they will engage in behavior.

Findings of this study are aligned with previous research, the findings indicate that an individual's situational motivation to react to social injustice and environmental protection issues, resulting from situational perceptions (problem recognition, constraint recognition and involvement recognition), leads to their collective behaviors to check moral indiscretions of social members and market players (Shim et al., 2023). Although the findings of the some previous studies suggest that STP is not desirable as it does not impact individuals' taking actions on environmental issues (Liu et al., 2019), this study empirically support claims that STP effects ethical purchasing behavior mediated by norms and positive attitude to action taking. In another word, recognizing an issue as a problem, and involvement with issue may not deter ethical behavior, unless problem recognition and involvement forms norms and attitude. This study contributes to the literature by illuminating how situational motivations lead to social norms that promotes attitudes and behavioral intentions in an ethical context.

This study found that people who perceive an ethical issue as a problem involving them are likely to be motivated to participate in activist purchasing behaviors. A high level of norms was found to play a mediating role between independent variables and consequential ethical activism behaviors. These results indicate that consumers have the motivation to form norms and develop an attitude against animal testing cosmetic products when they perceive cruelty free products as a problem and see themselves part of the problem. For public relations professionals, these findings highlight the importance of informative campaigns against cruelty free products, and pro-active manufacturing decisions before they manifest into crises. Public relations professionals can better communicate how to mitigate and prepare for animal testing cosmetic products by helping consumers perceive cruelty free products as a problem and see themselves possibly affected through effective communication intervention campaigns. Additionally, when issuing marketing campaigns organizations need to emphasize who is at risk. Current wording in messages such as “save the planet” may not adequately engage consumers that they are at risk, but more targeted message as “mothers with children”.

Problem recognition can trigger an individual's situational motivation that leads to activism behavior: “a problem is a joint product of individuals' mind and the perceived world” (Chon & Park, 2020, p. 19), so the rationale of ethical participation is that people hope to solve a problem collectively. In this case, the ethical problem recognition as a prime mover will increase people's willingness

to “stop to think about what to do” and participate in ethical activism as they felt the issues had become serious and inconsistent with society's ethical beliefs (Shim et al., 2023).

From commercial organizational point of view, as problem recognition plays a prime mover role in the overall problem-solving process in an ethical context, organizations should reduce individual's ethical problem recognition. When setting up a communication plan, an organization should showcase their positive role in addressing the ethical problems (e.g., to show companies commitment and efforts to not to use animal testing cosmetics). The response strategy should be effective enough to create an “ethical dilemma” (Shim et al., 2023), which refers to a situation in which one has a difficult choice to make between two ethical options. This study also suggests that a marketing message should be sought to manage the levels of perceptual factors when setting up a communication plan in response to an ethical public crisis.

Meanwhile, constraint recognition was not a significant factor because consumers feel incapable of addressing fight against cruelty free product issues on their own because individuals alone can hardly make an impact on such complicated social issues. The findings also indicated that stronger involvement recognition notably motivates people to participate in ethical activism.

Second, the findings in this study also contribute to theoretical developments in predicting cruelty free product purchasing intentions. The result shows publics with higher problem recognition, involvement and reference criterion are more likely to form norms, resulting in positive attitude development and purchase behavior intention. Previously, Kim and Grunig (2011) argued a strong intention or motivation does not necessarily lead to actual behavior, but this study demonstrates the predicting role of norms to behavioral intention in the ethical purchasing decisions. In this sense norm formations can link ethically- minded consumers to ethical behavior. In this regard, this study corroborates that norms are in need of STP to better understand how a consumers engage in behavior beyond attitudes. In addition, this study theoretically advances literature by empirically elucidating how consumers can arise as consequences of organizational behaviors, especially toward ethical issues (if consumers are not aware of such a problem and do not feel involved, social norms may not be formed). As problem recognition plays a prime mover role in the overall problem-solving process in an ethical context, organizations should reduce individual's ethical problem recognition. When setting up a communication plan, an organization should showcase their positive role in addressing the ethical problems. Moreover, to increase involvement recognition the plan should also let the audience be aware that they are closely related to the issue.

This study is not without limitations. First, the study used a non-probability sample based on an online panel from google forms, so the result cannot be statistically generalized. So future studies should be conducted with probability sampling to strengthen the external validity. Second, we strived to explore individuals' perceptions and the subsequent impact on intentions to against ethically problematic social issue, animal testing cosmetic products. It should be considered that this study used a hypothetical and manipulated situation where respondents are exposed to visual stimuli that focus on the moral problems that those specific issues have raised. This method might have increased the impact of perceptual variables than may be felt in real-life contexts.

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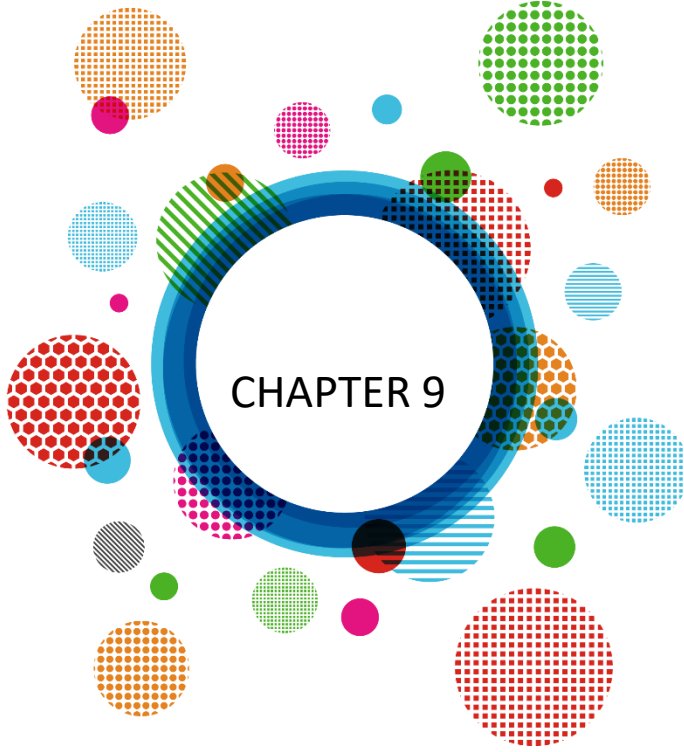
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New Generation Banking: A Conceptual Framework for Digital Transformation in the Financial Sector

İdris Adıgüzel¹

¹ Dr., ORCID: 0000-0002-6737-4387

1. INTRODUCTION

Digital transformation is one of the most important issues for all sectors of the economy today. The first signs of digital transformation emerged with the invention of the computer in the mid-20th century, and then this process accelerated with the invention and widespread use of the internet, personal computers and mobile phones (Pakdemirli, 2019). Digital transformation has become an important mega trend that affects all sectors of the economy today. Although it varies in every sector and business, the technologies that come to life with digital transformation facilitate the lives of consumers and offer great advantages to businesses that adopt these technologies. Especially the banking sector stands out as one of the areas where digital transformation is experienced most intensely. The development of digital technologies in this sector is of great strategic importance in terms of the progress of banks and emerging threats to commercial asset problems (Wirdiyanti, 2018).

Digitalisation represents not only a technological transformation, but also a multidimensional paradigm shift that fundamentally reshapes the way economic actors work, service production methods and customer relations. This transformation is most evident in the financial sector; in particular, the banking sector has had to significantly restructure its traditional structure under the influence of digital technologies (Vives, 2019). The concept of next-generation banking refers not only to the use of technological tools but also to a transformation process that integrates many elements such as customer orientation, process optimisation, personalisation and data-based decision-making with the digitalisation of banking services (Gomber et al., 2018).

Next-generation banking is leaving traditional service models behind thanks to innovative technologies such as mobile applications, open banking, artificial intelligence, cloud computing and blockchain. These developments make financial transactions faster, safer and more user-friendly. In addition, digital banking provides customers with 24/7 service by reducing branch dependency and ensures operational efficiency.

2. DIGITAL TRANSFORMATION IN THE BANKING SECTOR

The foundations of banking services can be traced back to some practices in ancient civilisations such as Babylon and Sumer. However, banking gained its real momentum after the industrial revolution. The securitisation of property in the UK, which started the industrial revolution, accelerated economic growth and contributed significantly to the deepening and development of financial markets. In addition, the fact that foreign investors and merchants started to carry out their trade and investments through the UK played a major role in the country's emergence as a world financial centre (Güneş & Akyüz, 2021). Countries have

been influenced by this process not only economically and politically, but also culturally and technologically. With the Industry 4.0 era, the whole world has entered a digital era (Aydınbaş & Erdinç, 2022).

Digital transformation in the banking sector is a multidimensional and systematic transformation process caused by changes in customer expectations as a result of technological developments, the rise of financial technologies, regulatory innovations and increasing competition. This process reshapes banks' strategic orientations, service delivery methods and organisational structures.

2.1. Technological Developments

Developments in information technologies have accelerated innovations and these innovations have deeply affected the banking sector. This impact manifests itself at every stage, from the design and delivery of services to customer interactions and business processes. Especially in recent times, the experience offered to customers has undergone a significant transformation. Existing processes have been restructured in line with technology. Moving away from the traditional banking approach, systems such as automatic teller machines (ATMs), Electronic Fund Transfer (EFT), Instant and Continuous Transfer of Funds (FAST), as well as the widespread use of debit cards and the development of mobile applications have provided customers with easy and uninterrupted access to services.

Tools such as cloud computing, artificial intelligence, big data analytics, and the Internet of Things (IoT) enable efficient banking operations in terms of speed and security. These technologies make it possible for banks to better analyse customer behaviour and offer personalised services by making transaction processes faster and decision support systems stronger.

2.2. Changing Customer Expectations

Today's financial consumers demand services that are faster, easier, transparent and accessible. The digital generation's approach to banking is orientated towards mobile applications, digital wallets and instant transaction experiences rather than traditional branch-oriented relationships. In this context, customer experience is directly related to service quality, user interface, transaction time and personal data security. New generation banking aims to increase customer loyalty by meeting these demands.

2.3. FinTech

Through financial technology, users can make payments, transfer money, apply for loans, purchase insurance, manage their portfolios and make investments through various mobile services (Fettahoğlu & Kıldızı, 2019).

Fintech is a term that refers to the deepening relationship between technology and financial services. This new sector aims to facilitate trading processes, improve corporate transactions, and improve services to retail consumers by bringing together various technologies used in the field of finance. Financial technology has created an important intersection between the financial sector and technology. This transformation is based on financial institutions adopting technology more effectively (Bonsu, 2017). After the 2008 global crisis, FinTechs have become one of the fastest growing entrepreneurship areas as a competitor to traditional banking (Belli, 2019).

Financial technology (FinTech) companies have become an important competitive factor in the sector thanks to their ability to offer innovative solutions to the market faster and at lower costs, which traditional banks have difficulty in offering. Especially with payment systems, microcredit applications, digital investment platforms and insurtech solutions, FinTech offers alternative channels for users by democratising access to financial services.

2.4. Regulatory Innovations

The development of the regulatory framework in the digital transformation process is an important element supporting innovation. In particular, the issuance and use of strong customer authentication solutions, such as PSD2 (Payment Services Directive 2) implemented in the European Union, allows authorisation to be dynamically linked to the specific amount and recipient (European Central Bank, 2018).

2.5. Digital Competition

Digital competitiveness refers to the acceptance of digital technologies in an economy and the capacity to innovate with these technologies (Martincevic, 2022). A competent workforce, advanced digital platforms and effective digital marketing strategies are the key elements of digital competitiveness. Countries with these elements have the advantage of maximising economic opportunities by successfully managing technological transformations and gain a competitive position in both national and global markets (Duran and Soydan, 2023).

Digital transformation has led to competition on a global scale. A bank has to compete not only with its competitors in its own city but also with digital banks operating in another country. Technology-oriented service models enable the expansion of cross-border digital financial services. This accelerates product development processes and requires a greater focus on customer satisfaction.

3. NEXT GENERATION BANKING

Next-generation banking aims to provide customers with faster, easier and more personalised experiences by combining traditional banking services with digital technology and innovations. In parallel with the evolution of the financial sector, a constantly evolving structure is on the agenda. This approach, which emerged with the digital transformation of the financial sector, aims to keep pace with the development of customer behaviour, expectations and technology (Özeren, 2023).

Next generation banking is a multidimensional concept that refers to the transformation of traditional banking thanks to the opportunities provided by digital technologies. This model brings about a detailed strategic transformation including customer orientation, process automation, data-based decision-making, personalisation and a culture of continuous innovation by providing services through digital channels. New generation banking aims to provide customers with easily accessible and flexible services through digital solutions such as mobile applications, internet banking, artificial intelligence, blockchain, cloud computing, open banking and API technologies.

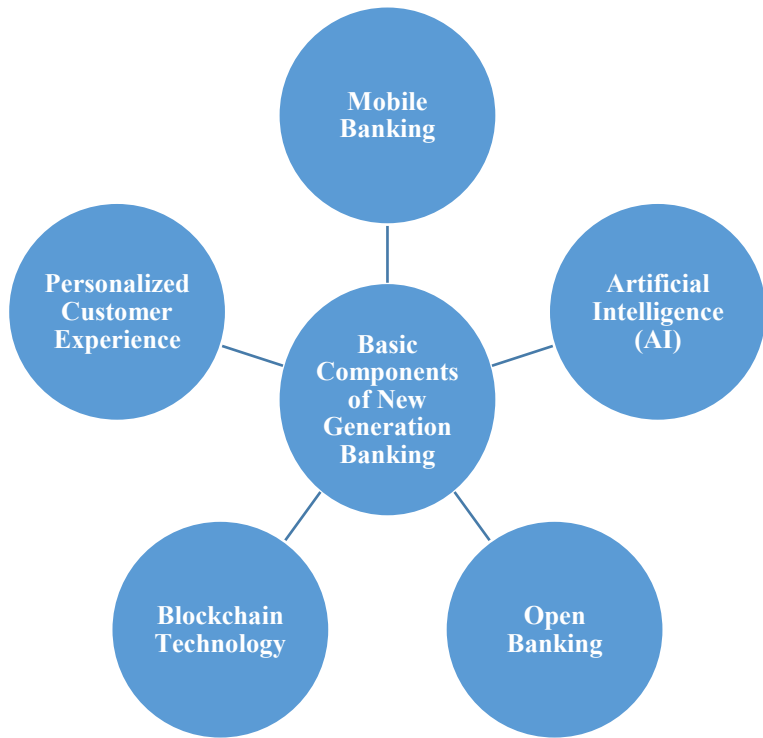
Next-generation banking works with digital infrastructure and minimises the need for physical contact (Vives, 2019). In this way, banks can serve their customers independently of time and space and significantly reduce their operational costs. Moreover, advanced data analytics enable banks to analyse customer behaviour and develop more personalised financial recommendations (Gomber et al., 2018).

As a technological innovation, next generation banking implies a change in banks' business models, organisational structures and strategic orientations. In this context, the digitalised banking sector also redefines service delivery methods, customer relationship management, competitive strategies and financial inclusion approaches (Arner, Barberis and Buckley, 2020).

3.1. Key Components of Next Generation Banking

Next-generation banking is a holistic transformation that puts technology at its centre, prioritises customer experience and reshapes operations from start to finish. This transformation is characterised by the convergence of various technological and strategic elements. These elements radically transform the structural dynamics of the banking sector by redefining financial services.

Figure 1. Key Components of Next Generation Banking



Mobile banking is one of the most prominent elements of contemporary banking. Thanks to the widespread use of smartphones, users can perform banking transactions from anywhere and at any time. The robo-adviser application, one of the applications of artificial intelligence in the banking sector, was first launched in 2008. The robo-advisor application provides bank customers with a digital-based investment advisory service without human beings (BearingPoint, 2019). Artificial Intelligence (AI) is used in many areas from customer service to risk management. It has shaped the customer experience with chatbots, voice assistants and personalised recommendation systems. Open banking is defined as the opening of customer financial information by banks (with the permission given by the customer) to the use of third-party organisations. With Open API, banks can offer attractive advantages and innovative products to their customers by different companies (Kenar, 2019). Thanks to open APIs, it paves the way for the emergence of more flexible and integrated service models by developing cooperation opportunities between FinTech companies and banks. Blockchain consists of a decentralised ledger structure with a decentralised immutable data storage system (Kızıl et al., 2019). Blockchain technology has reorganised financial systems thanks to its advantages such as secure data transfer and transparency. Beyond cryptocurrencies, this

technology offers great application potential in many areas such as payment systems, smart contracts and authentication.

Personalised Customer Experience aims to provide customers with special offers, product recommendations and transaction conveniences through big data and algorithms. This increases customer satisfaction and makes bank-customer relationships more sustainable.

3.2. Theoretical Approaches to Innovation and Transformation in Banking

The emergence of next-generation banking applications is evaluated in terms of reshaping business models as a technological advance, digitalisation of customer relations and transformation of strategic orientations (Vives, 2019). In particular, three main theoretical approaches are unfolded in Table 1 below.

Table 1. Theoretical Frameworks Guiding Banking in the Digital Transformation Process

Disruptive Innovation Theory	The theory of disruptive innovation developed by Clayton Christensen in 1997 sheds light on the loss of competitiveness of established firms in the market in the face of new actors offering low-cost, accessible and innovative solutions. Technological innovations can be incremental or disruptive. Incremental innovations are characterised by small improvements to existing products, services and processes. On the other hand, disruptive innovations can create new markets and business models and often displace market leaders (Christensen, 1997). FinTech companies and digital platforms threaten the business models of traditional banks with their easy, fast and user-friendly banking solutions and force these institutions to undergo digital transformation. In this context, neo-banks, mobile payment systems and blockchain-based financial services stand out as examples of disruptive innovation (Gomber et al., 2018).
Technology Acceptance Model	One of the many models produced to explain the adoption of technology is the Technology Acceptance Model developed by Davis in 1989. Davis' model is the most frequently used model in studies on the use of information systems (Venkatesh, & Davis, 2000). According to this model, two main factors determine the adoption of a technology: perceived usefulness and perceived ease of use. Users' perceptions of these technologies are very effective in the spread of digital banking applications (Venkatesh and Davis, 2000). In particular, factors such as user-friendly interfaces of mobile applications, transaction speed, security level and 24/7 accessibility increase the acceptance rate of the technology (Zhou, 2012).

Value Approach	Creation	According to Prahalad and Ramaswamy, although firms have focused on firm-centred value creation processes for the last century, today they are oriented towards consumer-centred value creation processes. They argue that customers are not only passive service recipients but also business partners who play an active role in the process (Prahalad and Ramaswamy, 2004). Next-generation banking applications offer personalised products by analysing customer data, thus creating a value creation process based on interaction (Lemon & Verhoef, 2016). This process provides a sustainable competitive advantage for banks by increasing customer satisfaction and loyalty.

These theoretical approaches address the structural, technological and customer-oriented transformation of digital banking at a conceptual level, emphasising that next-generation banking is not only a technical transformation, but also a process of strategic and cultural evolution.

3.3. Advantages and Disadvantages of Next Generation Banking

New generation banking refers to the transformation of the traditional banking approach that emerged as a result of the integration of digital technologies with financial services. This transformation has transformed the customer experience, banks' operational, strategic and competitive positions. However, along with the opportunities offered by digitalisation, new risks, inequalities and adaptation problems have also emerged. Table 2 discusses the advantages and disadvantages of this new structure.

Table 2. Advantages of Next Generation Banking

Accessibility	New generation banking applications enable users to make transactions 24/7 via internet or mobile devices without being dependent on branches. This makes banking much more accessible for both individual and corporate users by eliminating time and space limitations.
Cost Effectiveness	Digital transformation enables banks to significantly reduce their operational costs. By reducing the number of branches, reducing the need for physical infrastructure and managing processes through automation, both human resources and time-based costs are minimised. This leads to a more sustainable financial structure for banks.
Personalised Services	Technologies such as artificial intelligence and big data analytics enable customers to offer tailored services by analysing their financial behaviour. For example, campaign recommendations can be developed based on credit card spending habits or portfolio recommendations can be developed in line with investment profiles. Such

	personalisation not only increases customer loyalty but also strengthens brand value.
Innovation and Flexibility	Next generation banking enables integration with various platforms through FinTech collaborations and open banking applications. This offers more service options and product diversity. API technologies allow banks to come together with external developers to develop innovative products.
Environmental Sustainability	Digital banking significantly reduces the use of paper, reduces the carbon footprint by eliminating the need for travel and minimises energy consumption. These features offer an effective sustainability tool for organisations seeking to minimise their environmental impact.

Table 3. Disadvantages of Next Generation Banking

Digital Access Inequality	The widespread use of digital banking does not mean that every individual or region has equal access to these services. Especially those living in rural areas, elderly individuals, low-income groups or users with insufficient digital literacy may experience difficulties in accessing these services.
Cybersecurity	Increasing digitalisation makes customer data and financial transactions vulnerable to cyber-attacks. Threats such as phishing, malware, DDoS attacks and data leaks risk not only customer security, but also the reputation and financial stability of organisations. Banks that do not have a strong cyber security infrastructure face serious dangers.
Distancing from Human Contact	Digitalisation can offer a negative experience, especially for elderly individuals in need of counselling services or users who are distant to technology. Lack of face-to-face communication may create a coldness in customer relations and this may negatively affect customer satisfaction.
Regulatory Compliance Issues	The rapid advancement of financial technologies raises the problem that the relevant regulations cannot be updated at the same pace. Especially in the areas of open banking, data sharing and cross-border digital services, legal gaps and lack of supervision may arise. This situation creates uncertainties for both customers and banks.
Transformation Costs	The digital transformation process requires significantly high investment costs, especially for large and well-established banks. Modernising the hardware infrastructure, developing software, enhancing the digital competencies of the staff and restructuring the organisational culture impose significant burdens in terms of time, cost and human resources.

Next-generation banking brings benefits to both customers and financial institutions with the advantages of digital technology, but also systemic risks and social inequalities. This transformation requires careful management. While cost reduction and personalised services make banking more sustainable, cybersecurity weaknesses, human touch distancing and regulatory compliance issues can threaten the benefits of next-generation banking. The digitalisation process requires not only technology empowerment but also customer-centric approaches and inclusive policies. It is important for banks to reshape human-centred service delivery.

4. DIGITAL FUTURE OF BANKING: KEY ELEMENTS

Next-generation banking represents a multidimensional and dynamic structure that combines technological, organisational and strategic changes caused by digital transformation in the financial sector (Vives, 2019). The conceptual model presented in this framework is built around five main components to comprehensively examine the effects of digitalisation on the banking system: technological infrastructure, customer experience, organisational transformation, ecosystem collaborations, and digital security and regulation.

4.1. Technological Infrastructure

Cloud computing, artificial intelligence, big data analytics, blockchain and API-based open systems are among the basic building blocks of next generation banking. These technologies increase the speed and flexibility of financial services and pave the way for product and process innovation.

4.2. Customer Experience and Engagement

Digital banking combines user-friendly interfaces, 24/7 access and personalised services to increase customer satisfaction and strengthen loyalty. With the impact of technology, customers are becoming active participants in the process of creating value over time. At this point, technology-supported experience design has become the key to competitive advantage (Lemon & Verhoef, 2016).

4.3. Organisational Transformation

Digital transformation is changing the organisational structure, leadership approach and human resources policies of banks. Agile management approaches, the development of digital competencies and an innovation-oriented corporate culture are crucial for the success of this transformation process. This structural change enables banks to gain flexibility in a competitive environment.

4.4. Ecosystem and Collaborations

Through open banking and API-based integrations, banks are expanding their product range and reach by developing strategic partnerships with FinTechs (Arner, et al., 2020). This digital ecosystem creates a mutually beneficial value chain between traditional financial institutions and technology companies. Thus, banking goes beyond being an institutional service and transforms into a multi-actor platform model.

4.5. Digital Security and Regulation

The ever-increasing volume of digital transactions, data sharing and third-party access significantly affect banks' responsibilities in cybersecurity, data protection and regulatory compliance. Therefore, building effective cybersecurity infrastructures, implementing strong authentication mechanisms and complying with international regulations are vital for the sustainability of digital banking (Basel Committee, 2021; EBA, 2022). Case examples illustrating how each component of the conceptual model has been implemented by different neo-banks are described below.

The Revolut implementation corresponds to the technological infrastructure component and illustrates the structural effects of digitalisation. It is a UK neobank integrated with a multi-currency debit card. The Revolut application allows you to convert funds from one currency to another at the interbank exchange rate, make transactions with cryptocurrencies, carry out free money transfers anywhere in the world, as well as buy insurance and apply for loans. Revolut provides an advanced technological infrastructure by utilising cloud-based architecture, API technology and artificial intelligence supported systems while providing financial services. Features such as real-time transaction tracking, instant notifications and automatic categorisation not only increase operational efficiency but also significantly strengthen customer satisfaction.

Monzo is a digital bank based in the UK. It is a successful example of the customer experience and engagement component. The app's simple and intuitive interface, 24/7 accessibility and personalised notifications keep users constantly engaged with the app. It provides customers with money management content such as weekly spending account summaries, spending trends and financial transaction categorisation. Virtual account setup and management allows bills to be paid from a specific virtual account. It offers access to capital through open loans and Monzo loan products, access to savings accounts through market partners and the ability to open private accounts with additional software tools and ancillary payments.

N26 is a new generation banking platform based in Berlin, Germany. Popular among young people, N26 offers international money transfers, cash withdrawals, investments, overdraft accounts and in-store deposits. Its customers

can easily control and manage all their financial transactions through a smartphone application. This structure is the best reflection of the ecosystem and collaborations component in digital banking. In order to increase the diversity of financial services, strategic partnerships were established with FinTech and insurance companies operating in various fields such as TransferWise, Allianz and Raisin. Thanks to these collaborations, users can easily access a wide range of services such as foreign currency transfer, insurance and investment through a single application.

Starling Bank, UK-based Starling is a remarkable initiative in the field of digital banking. This digital bank, which stands out with its products focusing especially on young people, offers its users different account types such as personal, business, commercial, joint, multi-currency and children's card. This structure successfully reflects the digital security and regulatory dimension of the conceptual model. Starling Bank is notable for its strict compliance with European regulations such as PSD2 and GDPR and its advanced cyber security protocols with two-factor authentication systems. Transparent policies for the protection of customer data and full compliance with regulatory authorities contribute to making Starling a strong actor in the digital trust building process.

5. CONCLUSION

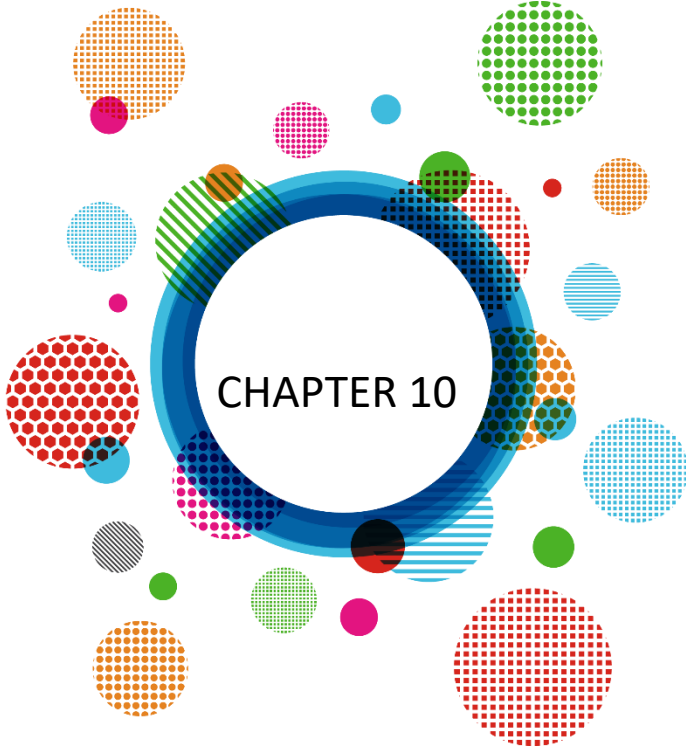
The rapid replacement of traditional banking models with customer-oriented and platform-based structures that are rapidly integrated with digital technologies brings about not only an operational but also a strategic and cultural transformation. Digital banking applications bring many advantages such as reducing costs, increasing transaction speed, strengthening financial inclusion, providing personalised services and time-space independent customer interactions. However, along with these advantages, significant disadvantages such as digital inequality, cyber security vulnerabilities, data privacy issues, lack of customer contact and non-compliance with regulations should not be ignored. For this reason, the digital transformation process is not only a technological adaptation, but also a multi-stakeholder change involving strategic, social and legal dimensions.

Digital transformation leads banks to a radical change process. Banks should not only address digitalisation at the operational level, but also adopt a digital leadership approach, increase the digital competencies of their employees and create organisational structures that support innovative thinking. At this point, the integration of data-based decision-making culture with strategies centred on customer insights is of great importance. At the same time, in today's world where financial technologies are developing rapidly, it is essential for regulatory authorities to create a flexible, technology-compatible and proactive legal infrastructure that can adapt to this change.

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Women's History in the Shadow of Gender Studies

Meliha Köse¹

¹ Prof. Dr., Gazi University, ORCID: 0000-0001-9837-9087

Introduction

Men and women, created from the same essence, began their journey in the world together and have jointly produced every form of heritage left to us today. History, as a scientific field, is concerned with this legacy from the past. It attempts to explain this heritage based on documents and sources. According to Collingwood (1990), history exists for human beings to know themselves. It is a valuable discipline because it teaches people what they have done and who they are (p. 29). One of the main tasks of historians is to interpret the legacy of humanity through objective methods based on documents and sources, and to present this as knowledge in the field. However, traditional historiography has preferred to focus on the legacy of powerful men and political events. It has excluded women and ordinary people, who constitute half of humanity. As Gisela Bock (2004) states, “*a history without the other half of humanity is not even half a history: a history without women cannot do justice to men either, and vice versa*” (p. 2).

This exclusion in historiography has undoubtedly not escaped the attention of intellectual women. Virginia Woolf, in her famous work “*A Room of One’s Own (1935)*”, laments the invisibility of women in the pages of history. One of the prominent intellectual women of the Ottoman period, Halide Edib Adivar, also expressed her desire and expectation for the documentation of women’s history in her article titled *Women in the Twentieth Century*, published in the *Mektep Müzesi* magazine on May 1, 1913, with the following words:

While writing this superficial and preliminary history of this sacred women’s movement, I wished from the heart that this account could be a brief chronicle of Ottoman women’s progress and development. However, for this not to be the case today is not, in my view, a tragic failure. Everywhere, the awakening and advancement of women, like all movements, has been a gradual and sequential process. The absence of a historical record of Ottoman women’s efforts on the path of progress does not mean that they have achieved nothing. On the contrary, to be able to speak today, in a grand and public theater, about a subject as intimate as womanhood—and to find in that theater a respectable and sizeable audience composed of Ottoman women listening to such a topic—is something to be proud of. At this very hour, as I address you and as you listen to me, it means that we too are making history. When one day our descendants create a long and proud narrative that fills an entire conference, they will surely speak of our humble yet well-intentioned and sincere struggle, won with countless difficulties (Cited in: Çakır, 2011, p. 517)

Although women were excluded from traditional historiography, it is known that intellectually developed women who had the opportunity to educate themselves were interested in their own history. One of the main goals of these women was to reveal the historical roles and contributions of women to history. For example, Fatma Aliye (2011), one of the intellectual women of the Ottoman

period, is among them. In her book “*Nisvan-ı İslâm*”, published in 1892, she primarily sought to introduce Muslim women to European women. In the book, she provides information about the historical achievements of prominent women from the Islamic and Turkish worlds.

In the West, Christine de Pisan, who lived between 1363 and 1431, authored “*The Book of the City of Ladies (Le Livre de la Cité des Dames)*” in 1405, and the renowned American feminist Margaret Fuller (1810–1850) wrote “*Woman in the Nineteenth Century*” in 1845. These works are considered among the earliest examples of women contributing to the writing of women's history (Çakır, 2011).

Although in earlier periods women tried to include women in historiography through their own writing, it took a long time for women's history to be recognized as a distinct academic field. This required a transformation of the traditional historiographical perspective, which focused primarily on powerful men and political events. The rise of social history and the Annales School brought a new perspective to the discipline of history by centering the lives of ordinary people. According to François Simiand, the three idols of traditional historiography that must be overthrown are politics, chronology, and the history of great men. This is because traditional historical writing has prioritized these themes while excluding all others (as cited in Delice, 2011, p. 107).

Founded by Marc Bloch (1886–1944) and Lucien Febvre, the Annales School challenged these three idols and created space for local historians and social historians. With the influence of the Annales School, historical thought in the nineteenth century began to engage with concepts like macrohistory and microhistory. According to microhistorians, history is not a grand, singular narrative. Rather, it is a complex structure that contains many intertwined stories within the larger narrative (Appuhn, 2001; Özdemir, 2021). Microhistorians have argued that treating history as one grand narrative leads to the neglect of smaller social structures. In their view, subjects such as family history are among the areas that deserve to be included in microhistorical research (Özdemir, 2021). The first fields in which the influence of the Annales School and microhistory studies became evident include social history, cultural history, the history of childhood, family history, and women's history.

It is also important to emphasize the significant influence of feminist historians in the emergence of women's history as a field of research. According to Tilly (1989), what distinguishes women's history from other types of history is that it is essentially a history of a movement, largely written through feminist thought and belief. Thanks to this field, the understanding has emerged that history is not solely composed of male achievement narratives, but that women, as subjects, have always existed on the stage of history and have played active roles in it (Tilly, 1989).

As a result of new developments in the field of history, women have begun to more actively seek out their own histories. This pursuit has been and continues to be conducted under the headings of “women's history” and subsequently “gender history”. During this process, criticisms directed at the field of women's history have sparked comparisons between “women's history” and “gender history.” While Sangster (1995) considers the criticisms of women's history to be unjustified, Iacovetta and Kealey (1996) argue that this distinction creates a false dichotomy. According to them, researchers engaged in gender studies also produce significant work in the field of women's history, and it is not appropriate to treat these two areas as separate. Ultimately, women's history cannot simply disappear, as the two fields complement one another.

Sangster (1995) also notes that a group of feminist historians emerging after the 1970s became uncomfortable with the critiques labeling women's history as “marginal,” “narrow in scope,” or “inadequate.” Nevertheless, the current state of women's history and its position within gender studies remains a subject of ongoing debate.

This study, based on a literature review, compares women's history and gender history in order to assess the current state and development of women's history. For this reason, it is first necessary to explore what women's history and gender historiography entail.

1. Women's History

Women's history is a field of research that aims to make visible the experiences, roles, and contributions of women that have long been overlooked in historiography. At its core, this field represents a reaction against the neglect of women's experiences in traditional historical writing (Purvis, 2004; Scheiner-Fisher, 2013). More broadly, it is an interdisciplinary area that focuses on topics and subjects excluded from classical historiography, seeks to uncover the roles women have played throughout history using specific methodologies, and works in collaboration with various fields such as sociology, psychology, anthropology, economics, and law (Çakır, 2021; Scheiner-Fisher, 2013).

Traditional historiography, which has largely centered on the public actions of men by focusing on subjects such as kings, wars, parliaments, and diplomacy, has resulted in historical knowledge and education being framed mostly around male experiences. Within this framework, women have typically been relegated to secondary roles—as wives, mothers, or muses—appearing only indirectly and in limited numbers (Köse, 2015). Women's history seeks to address this gap in traditional narratives and to demonstrate that women, like men, are active historical agents (Pető, 2009). By focusing on the lives, struggles, and achievements of women, it helps balance the historical narrative. In doing so, it

offers a fuller picture of human history and enriches historical knowledge. It also explores how women have been affected by historical events and processes.

In the early stages, scholars working in the field of women's history employed the methodologies of traditional historiography. Within this framework, priority was given to documenting the lives of prominent women and female heroines. Their efforts were guided by the principles of scholarly historical writing, focusing on interpreting historical records and community histories from a particular perspective.

By the 19th century, however, the focus began to shift from merely compiling lists of exemplary women to serve as role models for girls, to collecting broader and more comprehensive sources and materials for women's history. This shift led to a growing interest in uncovering and preserving sources related to everyday life and ordinary women as well (Lerner, 1993).

1.1. The Historical Development of the Field of Women's History

It can first be stated that the emergence of social and cultural historiography, which turned toward the stories of everyday life and the histories of ordinary people outside of official narratives, opened the door for women's history and significantly contributed to its development and eventual success (Corfield, 1999).

By distancing itself from classical historiography and focusing on the experiences of ordinary people, social history began to draw attention to fields such as family history, labor history, and the history of emotions. As a result, topics like daily life, family, sexuality, and social rituals became legitimate areas of inquiry for historians (Birey et al., 2014; Çakır, 2011). Following this, the Annales School emphasized a holistic and interdisciplinary approach to human activity in history (Çarkçı, 2021). With this perspective, history moved beyond merely documenting the lives of powerful men and began to show interest in the historical experiences of ordinary people and marginalized groups. Despite these influential shifts in historiographical approaches, women's history did not receive sufficient attention and did not experience significant development as a distinct field until the 1970s (Çakır, 2011).

Even in the 20th century, women historians faced difficulties in gaining acceptance within the male-centered academic culture. They realized that success was unlikely without mutual support from other women. For example, Mary Beard's influential work, *Woman as Force in History*, was neglected and even ridiculed both within academic circles and beyond. However, from the 1960s onward, significant progress was made in the field thanks to the efforts of educated women (Lerner, 1993). Pioneering women researchers such as Joan

Kelly, Gerda Lerner, Nancy Cott, Alice Kessler-Harris, and Linda Gordon played crucial roles in advancing women's history (DeWoolf, 2021).

In the early 20th century, some biographical works and compilations began to document and acknowledge women's contributions to history (Dewolf, 2021; Lerner, 1993). However, the formation of women's history as an academic discipline primarily took place in the late 1960s and during the 1970s (Dewolf, 2021; Lerner, 1988; Scheiner-Fisher, 2013). Until the 1960s, women's history remained a largely neglected field (Dubois, 2006). The 1970s marked a period parallel to the rise of second-wave feminism, during which female academics started to raise their voices in universities, and questions regarding the history of the women's movement and the social position of women were seriously addressed. However, before 1975, women historians specializing in women's history were mostly self-taught and had limited access to formal academic education (Lerner, 1993). At that time, there were no graduate-level programs specifically focused on women's history. The first women's history master's program was established in 1972 at Sarah Lawrence College in the United States, under the leadership of Gerda Lerner (Gordon, Kerber, & Kessler-Harris, 2013). During the 1970s, the first courses on women's history were introduced in the US and Europe, conferences were organized, and research centers were founded. Academic journals dedicated to the field also began publication. Comprehensive books compiling women's history, such as those prepared by scholars like Georges Duby and Michelle Perrot (2005), made significant contributions to the international academic corpus of women's history. In America, the number of books published on women's history between 1960 and 1975 reached only about twenty-one. Lerner (1975) outlines a framework consisting of several stages in the documentation of women's history. The first is "compensatory" history, in which notable women are added to historical narratives. The second stage emphasizes the "contribution history," focusing on women's contributions. The third stage is the "oppression framework," which examines the history of women's subjugation and the production of their own concepts. Such frameworks indicate that by the 1970s, women's history had also reached a certain level of theoretical development.

The field of women's history experienced its significant rise in publication output in the United States between 1975 and 1980. From 1981 to the early 1987, there was a substantial increase in the number of academic studies produced. During this period, numerous theses on women's history were completed at universities (Lerner, 1988). At the same time, it was recognized that the term "women" alone was insufficient to explain all topics within the field, and women's studies began to evolve into "gender studies" from the 1980s onward.

Since then, the subject of women's history has continued as a field alongside gender studies (Dewoolf, 2021).

Women's history studies have developed with varying emphasis across different regions worldwide. In North America and Europe, women's history became institutionalized and established a place in universities starting from the 1970s, while similar research in Latin America, Asia, and African countries generally gained momentum in the 1980s and beyond. In Türkiye, it is also known that women's history studies increased after the 1980s. Before this period, there were very limited studies on the role of women within the discipline of history. Researchers from fields such as political science and sociology were more engaged with women's history, whereas historians initially showed little interest in this area. Since the 1990s, theses on women's history have started to be produced in universities and newly established women's research centers (Çakır, 2011).

The earliest women's history studies in Türkiye mainly focused on women's movements. Even by the early 2000s, there were no studies on the lives of ordinary women (Çakır, 2004). Following the new feminist wave after the 1980s, research analyzing Ottoman and Republican history from a women's perspective increased. Çakır (2011) classifies these studies as "*research on women's movements history; biographies; bibliographies; and studies related to women's social history*" (p. 519). Today, it can be said that most studies in Türkiye focus heavily on gender studies.

1.2. The Purpose and Scope of Women's History

The main purpose and motivation of the field of women's history is to develop a critical alternative to the general historiography often seen as "men's history," and to foreground women's historical agency. Researchers questioning why women have been invisible in history have also begun to critique the methods and sources of traditional historiography. Since documents related to the public sphere—such as wars, treaties, and politics—tend to highlight men, women's history has often had to be sought in experiences of the private sphere and everyday life practices. Diaries, letters, memoirs, court records, archival documents, literary works, oral history interviews, and women's magazines and newspapers—sources traditionally neglected by mainstream history—have become primary materials for women historians (Çakır, 2001, p. 28). Thanks to these sources, for example, it has become possible to draw conclusions about family life of the period from the letters of a housewife or to understand the role of women's labor in the industrialization process through oral histories of female factory workers.

Women's history is not limited to highlighting only female heroes or exceptional figures. Certainly, biographies of pioneering women who left their mark in history—such as Florence Nightingale (Cook, 1913), Marie Curie (Curie, 1938), Halide Edip Adıvar (Çalışlar, 2010), Fatma Aliye, Emine Semiye (Kurnaz, 2008), and the poet Nigâr Hanım (Bekiroğlu, 1997) have been part of women's history. However, the discipline of women's history aims to go beyond this and shed light on the collective history of ordinary women as well. Topics such as the roles of peasant women in agriculture, the gendered dimension of witch hunts in the Middle Ages, the daily lives of women living in Ottoman harems, and the struggles of working women during the Industrial Revolution have all become research areas within women's history.

Through these studies, historiography has become more inclusive, recognizing that the experiences of women, who make up half of society, are an integral part of history. The theoretical framework of women's history is closely linked to feminist theory. Many women historians have applied a feminist perspective to historiography.

For example, one of the historians who examines historiography from a feminist perspective is Gerda Lerner. In her works, she critiques patriarchy and feminist developments while providing theoretical frameworks (1986, 1993). Lerner (2013) argues that learning women's history is empowering for women and emphasizes the importance of this field by stating, "Women's history is women's right; it is an indispensable legacy from which we can draw pride, solace, and courage." Similarly, Joan Kelly posed striking questions such as "Did Women Have a Renaissance?" (1977), demonstrating that historical periodizations can operate differently from women's perspectives. Through such studies, general historical narratives have been reevaluated from a female viewpoint. To summarize the aims of women's history:

- Firstly, the aim of women's history is to make women visible within history and to construct a history that belongs to women. Within this framework, the field of women's history seeks to demonstrate that women have played significant roles in the past and contributed to the development of society and civilization.
- Secondly, it aims to capture the uniqueness of women's experiences and analyze how these experiences differ from those of men. For example, the experiences of a soldier going to war are as much a part of history as those of his wife left behind. This approach also brings different perspectives to history.

- Another goal of women's history is to reveal the injustices and obstacles that women have faced throughout history. This objective also sheds light on the roots of gender inequalities in history.

In conclusion, women's history not only facilitates the rediscovery of the past from women's perspectives but also contributes to a more inclusive history and allows for the interrogation of history through diverse viewpoints. Bringing women's history to light provides an opportunity to see humanity's historical experiences in a broader context. It includes women, who constitute half of humanity, as historical actors in historiography. Furthermore, through fields like women's history, recognizing the cultural heritage that includes various groups beyond great men and political events necessitates a transformation of collective memory.

2. Gender

After some time, researchers working in the field of women's history began to assert that gender is a formative historical force and that the term "women" alone is not sufficient to fully understand women's history (DeWolf, 2021; Scott, 1986). Some feminist historians of the 1970s emphasized that women were merely added into the existing historical narrative without critically examining all components of historical understanding. According to them, women's history was limited to describing women's "experiences" and lacked analysis of the "changes in relations between femininity and masculinity." Therefore, these kinds of studies failed to examine social structures. Early women historians, who were theoretically insufficient, attempted only to document women's experiences under the category of women, neglecting the complex relationships between class, race, and gender. In contrast, gender history had the potential to offer a multilayered, explanatory, and complex historical narrative (Sangaster, 1995). For this reason, scholars who believed that studies focusing solely on "women's history" were inadequate began to take an interest in "gender" as a historical research field toward the late 1980s (DeWolf, 2021; Dubois, 2006).

Gender, simply put, refers to the socially and culturally constructed dimension of being "woman" or "man" (Çapçioğlu & Çetin, 2020; Oakley, 1972). Unlike biological sex, it encompasses the roles, expectations, and behaviors that societies assign to individuals regarding femininity and masculinity. Simone de Beauvoir, in her 1949 book, described this concept as "One is not born, but rather becomes, a woman" (Beauvoir, 2019). From the perspective of gender, being a woman or a man is not innate but a phenomenon taught by society. Gender studies differ from women's history in that they position women in relation to men. However, the approaches of gender historians have sometimes raised concerns related to women's history. For example, Dubois (2006) noted that gender studies strongly

attracted academics to studies of femininity and masculinity, and indirectly posed a threat to women's history by reducing historical interest in women.

2.1. Historical Development of the Field of Gender Studies

The concept of gender is known to have been first used by Robert Stoller in his 1968 book *Sex and Gender*. Ann Oakley further contributed to the incorporation of this concept into the literature with her 1972 book *Sex, Gender, Society* (Çapçioğlu & Çetin, 2021). The concept of gender began to gain widespread acceptance in the social sciences from the second half of the 20th century and continues to be an important area of study today. The academic introduction of the concept of gender was significantly influenced by the second-wave feminist movements that gained momentum after the 1960s. These movements highlighted critiques emphasizing women's oppression both biologically and socially.

In the 1970s, researchers such as sociologist Ann Oakley (1972) drew attention to the distinction between "sex" and "gender," focusing more on the cultural aspects of femininity and masculinity rather than their biological dimensions (Vatandaş, 2020). From the 1980s onwards, a categorical approach was brought to the concept of gender. Notably, Joan Scott (1986) emphasized two dimensions in the study of gender: one as a foundational element of society based on perceived differences between the sexes, and the other as a fundamental means of making power relations visible. In other words, gender explains both the constitutive role of ideas about femininity and masculinity in social order, and how these ideas structure power relations. At the same time, gender plays a critical role in understanding social hierarchies such as race and class. Scholars engaged in gender studies analyze these hierarchies, discourses, and behaviors by drawing on approaches such as literary analysis, structuralism, cultural history, and anthropology (DeWolf, 2021).

The fact that new-generation women historians began to identify themselves as "gender historians" was also influenced by Joan Scott's presentation of gender as a useful category for historical analysis (Dubois, 2006). With the development of feminist theory, the theoretical framework of the concept of gender began to be enriched. In her 1990 work, Butler emphasizes that femininity and masculinity are formed through everyday acts. According to her, the repeated performance of these acts in daily life gradually becomes perceived as natural, providing individuals with an identity. Therefore, she argues that gender is not innate but rather a form of action developed within society (Butler, 2008). Gender scholars have seen the necessity of analyzing women's historical experiences through the lens of gender. Thus, gender historiography emerged. The gender approach accepts that women's and men's histories cannot be understood without referring

to each other. Methodologically, it incorporates a holistic perspective in the historical analysis of both women and men (DeWolf, 2021; Dubois, 2006).

Since the 1970s, it is believed that researchers working in this field have gone through three stages. In the first stage, emphasis was placed on the biological sex difference between men and women. Differences were thought to stem from biological characteristics. In the second stage, the idea that gender is learned through environments such as family, school, media, and peers was highlighted. In the third stage, the social and historical origins of gender began to be examined, and the effects of hierarchical power relations in society on gender identity were questioned (Kocadaş, 2020).

Researchers in Türkiye working on women's history and gender studies have played a pioneering role in raising awareness in this field to some extent. For example, Berktaş (2003), in her work titled "The Gender of History," illustrated the stages feminist historiography has gone through and its contributions to the field with examples, helping to improve the understanding of gender historiography in Türkiye as well. Alongside women's history, numerous studies have been published in this area. Çakır (2021), in her study, provides an extensive bibliography that demonstrates the current state of this field in Türkiye.

2.2. The Purpose and Scope of the Field of Gender Studies

The concept of gender today encompasses a broad scope of research connected to many disciplines. It has found its place among the subjects studied in numerous fields, ranging from politics and sociology to psychology, literature, anthropology, and religion. This is also the case in Türkiye (Çapçioğlu & Çetin, 2020).

Gender, which does not have a fixed or completed formation, shapes all the gender roles existing in society and family. This has also been the case historically. Therefore, when analyzing issues such as women's voting rights or working conditions, it is emphasized that these must be approached from a gender perspective. The male-centered perspective dominant in historiography, which ignores gender, has been critiqued through gender analysis. Since the late 20th century, those working in gender studies have criticized approaches that equate the historical "male" experience with the experience of humanity, thus helping to develop a more inclusive understanding of historiography. Undoubtedly, among these scholars are feminist researchers such as Judith Butler, Joan W. Scott, and Simone de Beauvoir. Feminist historians have persistently emphasized the importance of gender in understanding the historical process (Berktaş, 2003).

Historian Cecilia Morgan points out that in the current context, simply describing women's experiences is somewhat outdated in terms of historiography, and what is considered important is "to uncover the meanings of gender

identities” (Sangaster, 1995). In this case, it can be said that modern feminist historians and those practicing gender history are not only concerned with women’s experiences but are more focused on the gender patterns of the past and present. Today, feminism and gender have become fields embraced by a broad spectrum of women in terms of race, ethnicity, and gender identity (Dubois, 2006).

3. Differences Between Gender and Women’s History Research

Dewolf (2021) points out that there are many gender historians who do not focus on women’s history, as well as many women historians who do not study gender. According to her, there are important connections between the two fields. First, gender history partly draws on women’s history. Both fields are nourished by feminist theory and offer critiques of the male-centered traditional historiography. However, women’s history and gender history differ in terms of their focus and approaches. Women’s history concentrates solely on women’s experiences, whereas gender history addresses the relationships between genders in all their dimensions. The differences between the two fields can be summarized under the following headings.

3.1. Differences in Focus and Scope

As its name suggests, women’s history focuses directly on studying women as historical actors (Çakır, 2021; Dewolf, 2021; Scheiner-Fisher, 2013). Women historians strive to make visible women’s past experiences, actions, and social conditions; the subject of research is women. In contrast, gender historians or gender researchers examine the social roles of both women and men together and analyze how the concepts of “masculinity” and “femininity” have been historically defined and transformed (Çapcıoğlu & Çetin, 2020; Dewolf, 2021). In other words, women’s history aims to “include women in history,” whereas gender history applies a gender lens to every aspect of history to analyze how gender difference is constructed. For example, within women’s history, one might study “the history of women’s education in the Ottoman Empire,” while from a gender history perspective, the focus could be on “the reflections of femininity and masculinity perceptions in educational institutions during the Ottoman period.”

3.2. Differences in Terms of Goals and Question Structures

Women’s history questions why women have been invisible in history and aims to correct this. Its main goal is to add women’s contributions to history, document women’s experiences, and reveal the discrimination women have faced within a historical context (Purvis, 2004). Gender studies, on the other hand, take a broader perspective, aiming to understand the mechanisms through which the category of gender operates and questioning the cultural dimensions of gender

formation (Oakley, 1972). The questions asked in this field revolve around issues such as: “How is the gender difference produced, reproduced, and institutionalized?”, “What are the ideals of masculinity and femininity in different societies and periods?”, and “What are the connections between gender identities and power relations?” For example, a gender historian might examine legal history to analyze how laws in a particular period defined different expectations for women and men; whereas a women’s historian might document how women resisted these laws or built their own lives despite them during the same period.

3.3. Differences in Terms of Methods and Theoretical Frameworks

Women’s history was initially more influenced by the social history tradition (Berktaý, 2003; Corfield, 1999) and focused mainly on descriptive and documentary studies centered on the experiences of ordinary people—in this context, women. Methods such as oral history, microhistory, and biography studies are frequently used in this field. Gender history, however, emerged under the influence of cultural history and post-structuralist theories, following a more conceptual and analytical approach. As Scott noted in 1986, the adoption of the gender concept brought language, discourse, and representation analysis into historical research. Thus, gender historians do not only ask where and what women did, but also question how the concepts of “woman” and “man” are defined in minds and institutions and how these definitions change over time. For example, the historical origins of the roles “housewife” and “breadwinning man,” which emerged with modernity, and how these roles are constructed by literature, media, and ideology are questions for gender history. Women historians also use theory, but their focus can be said to be more on concrete events and experiences (Çakır, 2021). Nevertheless, today the two approaches largely influence each other and intertwine; most studies both try to uncover women’s experiences and apply gender analysis while doing so.

3.4. Differences in Terms of Inclusivity

Although women’s history appears to focus solely on women due to its name, its ultimate goal is actually to make history as a whole more inclusive. Women’s history, in a broader sense, is not only the history of women. Naturally, many overlooked stories are hidden within women’s historical experiences (Köse, 2015). For example, if the historical experiences of a mother are uncovered, it is also possible to reach the stories of her children and other family members through that information. In this way, it provides an opportunity to review the history of more ordinary people who have not been the focus of traditional history. In fact, it allows seeing more ordinary people in the larger picture of humanity’s past. However, it is also noted that women’s history, by focusing solely on women, might overlook the variables that shape women’s experiences (Dewolf, 2021). It is generally accepted that gender studies have a more inclusive

nature in this regard (Dubois, 2006; Sangaster, 1995). While women’s history primarily considers only women’s history, gender studies also include masculinity studies. Ultimately, it is acknowledged that women’s history and gender studies provide inclusivity in different dimensions.

3.5. Differences in Terms of Disciplinary Positions

Women’s history is a subfield of history; its main method is historical methodology (archival research, analysis of historical documents, etc.). Gender studies, on the other hand, is an interdisciplinary field that includes not only history but also anthropology, sociology, psychology, law, literature, cultural studies, and other disciplines (Çakır, 2021). Within academia, many universities have institutes or departments named “Women’s and Gender Studies,” which deal not only with history but also with contemporary gender issues, theory, politics, art, and broader topics.

Women historians usually receive their education in history departments, whereas gender researchers may come from various disciplines. However, especially since the 1990s, the use of the term “gender history” instead of “women’s history” has become widespread; many historians have oriented their work more towards gender history rather than women’s history (DeWolf, 2021; Dubois, 2006). To concretize these differences, the main distinctions between the two fields can be summarized as shown in Table 1:

Table 1
Differences Between Women’s History and Gender History

Areas of Difference	Women’s History	Gender History
Definition	Women’s history is a field focused on uncovering women’s experiences, roles, and contributions in history.	Gender history focuses on the socially and culturally constructed dimensions of “woman” and “man,” examining how these constructions change over time, thus expanding women’s history.
Origin	Emerged in the 1960s and 1970s as part of the feminist movement, reacting against traditional male-centered historical narratives.	A newer field that arose in the 1980s and 1990s, based on the view that the term “woman” alone is insufficient to explain women’s experiences.
Purpose	To eliminate the invisibility of women in history; to give women “their own history” and enrich historiography from a women’s perspective.	To use gender as an analytical category to explain power relations in historical processes from the perspective of gender; to reveal the historical construction of masculinity and femininity.

Theoretical Foundations	Feminist historiography and social history tradition; primarily based on interpreting historical documents in favor of women, often supported by feminist theory.	Feminist theory, post-structuralist theories (language, discourse theory), and cultural analysis; theoretical frameworks centered on gender (e.g., Scott's gender theory, Butler's performativity theory).
Fields of Study and Topics	Highlights women as subjects of history; examines women's experiences and actions; studies women's participation and marginalization; focuses on women's experiences.	Emphasizes the phenomenon of gender; studies the roles of women and men and their interrelations; examines how gender difference is produced and managed; addresses social roles of both women and men together.

The above table provides a general framework. Of course, in practice, the boundaries between women's history and gender history are not clear-cut. Many studies focus on women while simultaneously employing gender analysis. For example, a historian examining the clothing of Ottoman women in the 19th century might on one hand document the history of women's attire (within the scope of women's history), while on the other hand analyze the underlying gender norms and patriarchal ideology that inform these dress codes (through gender analysis). Thus, these two approaches often complement each other. Indeed, historian DeWolf (2021) notes that many historians combine both approaches in their research. Both women's history and gender history serve to address the shortcomings of male-centered narratives. On the other hand, there are also significant differences between them. According to DeWolf, women historians "foreground women as actors of history," whereas gender historians "focus on how ideas about what it means to be a woman or a man have shaped major historical struggles and events." In light of these explanations, it can be said that women's history is more organized around subjects (women), while gender history is organized more around concepts and relationships.

4. Why Should Women's History Research Remain Distinct from Gender Studies?

Some scholars have insisted that women's history should remain a separate field of study due to concerns that it might get lost or forgotten among other disciplines (Bock, 1991). Despite these concerns, women's history has evolved over time into gender studies, and the prevailing view today is that these two fields should be addressed together. Therefore, contemporary women's history research is mostly conducted alongside gender studies. This approach allows women to be highlighted as historical actors while also enabling historical sources to be analyzed within the context of gender (DeWolf, 2021).

Although there is a close connection between women's history and gender studies, there are important reasons for continuing women's history research as a distinct focus. Lori Ginzberg finds the incorporation of women's history into gender studies problematic because while gender includes women, it does not explicitly name them. Discussing issues through gender without centering women weakens the political nature of the feminist movement. In other words, it overshadows efforts to make women's historical struggles visible. From this perspective, it is necessary to rethink how women's history can be integrated into the mainstream (cited in Narvaez, 2016). Based on the literature, some of the reasons for maintaining women's history as a separate field of research can be outlined under the following headings.

4.1. Increasing the Historical Visibility of Women

Women's history emerged as a reaction against the great neglect of women in historical writing. For centuries, women's experiences, achievements, and struggles were not considered serious subjects of history, leading to the erasure of women from humanity's collective memory. Women's history research aims to remedy this deficiency—that is, to give women the place they deserve in history. While gender studies also include women when examining gender roles, writing women's history directly serves an empowering and restorative function for women. As Gerda Lerner (1986) stated, having a history of their own gives women pride, courage, and perspective. Therefore, women's history should be regarded as indispensable for the construction of women's collective memory.

Although women are addressed within gender studies, the development of a separate women's history literature is important for ensuring the continuity of women-centered historiography. In short, women's history is necessary to make women visible in history and to foster ownership of their past. According to Ginzberg, despite all feminist efforts, no significant change is seen in mainstream historical narratives. For example, women's history is still “pushed into marginal boxes” in American high school textbooks. The main texts continue to be dominated by white male voices (cited in Narvaez, 2016). This situation is true in many countries, and history textbooks still contain very limited information about women. Women's history, which does not fit the models of male achievement, struggles to be included in textbooks (Holt, 1990; Köse, 2024; Scheiner-Fisher, 2013; Shuayb and al-Sarraf, 2022).

4.2. Focus and in-Depth Analysis

Although gender studies offer a broad perspective, this wide framework sometimes carries the risk of not sufficiently focusing on women's specific experiences (Dubois, 2006). Women's history research can deliberately narrow its focus to examine women's lives in all their dimensions in depth. For example,

while a gender study might analyze the gender regime of a country in general terms, a women's history study can reveal the detailed history of a specific group of women during the same period (for instance, working-class women, women in the feminist movement, or a circle of women writers). In this way, the diversity of women and the experiences of women from different segments can be understood in detail.

Indeed, making visible the contributions of women to science, art, politics, and social movements is also important for ensuring historical justice (Scott, 1986), because women, as much as men, have shaped history. A focused approach where women's history uncovers and contributes these experiences to the literature should be the first step in understanding women's history. Gender inquiries should then be carried out based on the information obtained, which can be considered the second step. Currently, there are many women from various races and nations hidden in the dusty pages of history, waiting to be discovered. This shows that the more diverse and deep analyses the field of women's history contains, the greater the potential for general historiography to become inclusive.

4.3. Valuing Women as Historical Actors

Unlike traditional historiography, which often centered men and portrayed women as passive figures, women have played significant roles in political, social, economic, and cultural spheres (Köse, 2015). The idea that women were passive figures in history is actually a problem of historiography, which deprived women of their right to be subjects (Lerner, 1993). For this reason, the field of women's history highlights women as active agents of history and restores their historical value.

Positioning women not only as victims or supporters but as agents who have influenced and transformed historical processes is one of the fundamental principles of feminist historical understanding (Scott, 1986). The development of women's history as a distinct field aligns well with feminist goals. Gender studies, on the other hand, tend to remain more theoretical and analytical. Although they contribute significantly to women's studies in various dimensions, they do not always nurture women's historical visibility. Within gender inquiries, the experiences of women and women's roles as historical actors may remain in the shadows.

Women have fulfilled their roles as actors alongside men in every sphere of life throughout history and have endured hardships together. In this context, a history field focused solely on women is essential for creating a shared memory for women and placing them within the broader picture of humanity. Thus, it supports the discipline of historiography, which claims to study human history, and contributes to its scientific rigor. Otherwise, a historiographical approach that

ignores half of humanity will continue to fall short of scientific standards, at least in terms of inclusivity.

4.4. Academic Continuity and Specialization

Over the decades, women's history has developed its own methodology, source criticism techniques, and accumulated a body of knowledge. Historians specializing in this field have gained deep knowledge of women's experiences in specific periods and regions. If women's history is entirely subsumed under the broader category of "gender," it can be expected that the emphasis on this specialization will diminish.

In fact, the in-depth examination of women's historical experiences not only broadens the scope of historical science but also paves the way for the development of new methodological approaches (Lerner, 1993). Recognizing women's history as an independent field of research is also important for training scholars specialized in this area. This is necessary to provide a strong foundation for future academic discussions focused on women. For example, theories of patriarchy are nourished by concrete historical facts uncovered by women historians. Without historically grounded evidence regarding women's struggles for rights, it would be impossible to conduct meaningful gender analyses on the subject.

4.5. Preserving the Women's Perspective

Uncovering women's historical experiences is not the same as analyzing these experiences solely through the lens of gender roles. Researchers who focus on gender discourse in gender history risk overshadowing "women's subjectivity in history." According to Hekman (1996), the feminist movement's use of Foucault's approach does not define "woman" as a fixed identity. This implies the disappearance of the "woman" as a subject within the feminist movement. Therefore, it becomes practically important to conduct research that centers on women's history and explicitly assigns women the role of historical subjects. Gerda Lerner (1993) also emphasized that women need to produce their own history and maintain this historical consciousness.

Since the 1990s, gender studies have gained significant momentum in universities. One of the primary concerns of these studies has been to challenge traditional paradigms. In this context, women's studies have been recognized as a valuable academic field (Wiegman, 2012). However, with the prioritization of challenging traditional paradigms, it has also become difficult to preserve women's history as an independent field of knowledge.

The theoretical richness of gender studies contributes significantly to academic work. Nevertheless, for the reasons outlined above, it is meaningful and

necessary for women's history and gender studies to continue existing as two distinct but mutually enriching fields. Women's history sheds light on women's experiences, while gender studies analyze these experiences within the context of sexism and can propose fairer policies related to gender equality. Women's history should not be merely a complementary field to gender theory but should maintain its existence as an equally fundamental domain of knowledge.

Conclusion

Women's history began to take shape as a field in the 1970s and showed gradual progress until the 1980s. The 1980s marked the rise of gender studies. Researchers who believed that the term "women" alone could not explain all topics related to women began to conduct women's history research alongside gender studies. Since the 1990s, gender history and gender studies have become more central.

This study compared women's history and gender history, highlighting the weakening position of women's history as an independent field. Although the two fields often appear to work together, they differ in their aims, scope, and theoretical foundations. Increasing the visibility of women in historical research and analyzing sexist structures are common goals. While women's history transforms social memory by placing women's past in its rightful place, gender analysis provides the theoretical tools that help us interpret this past.

Numerous studies have been conducted and continue to be conducted worldwide on women's history and gender issues. However, it is observed that these studies are increasingly carried out under the umbrella of gender in this century. For example, in Türkiye, more research is conducted on how women are portrayed and positioned in history textbooks from a gender perspective. These studies also reveal that women's visibility in history textbooks has not increased significantly. Despite many works reflecting women's historical experiences, women have yet to find their place even in the history textbooks that provide historical knowledge to the country's children. At this stage, the question of which women and through which means they should be taught remains under-discussed, while analyses within the gender framework dominate, showing that women's history remains overshadowed by gender studies.

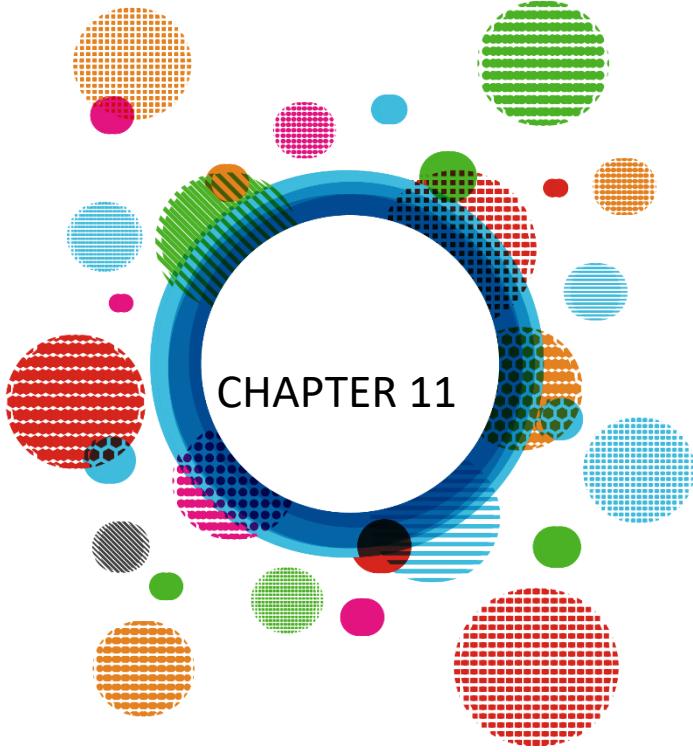
In conclusion, it is very important that both fields continue within their own scopes. Preserving women's history as a distinct field is invaluable for increasing the visibility of women and their experiences, enabling more in-depth analyses of women's history, and ensuring women are recorded as agents in historical writing. This will also increase the number of academics specializing in this area. Women's history will thus contribute materials to the field without remaining in the shadow of gender studies.

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Quiet Quitting of Employees: Conceptual Framework and Theoretical Insights

Niyazi Okan Çoban¹

¹ Dr., HR Specialist, ORCID:0000-0003-4835-6762

Introduction

In contemporary business, the advancement of digitalization and artificial intelligence, coupled with enhanced information accessibility, contrasts with the evolving behaviours and working styles of employees, as well as the flexibility and hybridization of work environments.

Organizations must adapt to these emerging trends and paradigm shifts to sustain a competitive advantage. The dynamic environment, characterized by swift economic, technological, and political transformations, induces significant alterations in managerial perspectives and leadership attributes, as well as in employee organizational behaviours.

The number of employees in organizations has increased over time due to changes, resulting in a *new working environment* characterized by extended hours, performance evaluations, and wage adjustments. This environment has proliferated with the digital age, leading to flexible working hours. The accelerated pace of professional life, prolonged working hours, and employees' inclination to remain always connected have adversely impacted their quality of life and disrupted their work-life balance.

The alteration in work methodology observed since 2021 has been termed *quiet quitting* in the literature, paving the way for a redefinition of the idea. The Covid-19 pandemic has marked a pivotal moment wherein employees dissatisfied with their organization's practices have opted not to exercise their alternative rights—such as “striking, locking out, resigning, or retiring”—but instead have displayed detrimental (dark) organizational behaviours, including silence, lack of initiative, failure to fulfil duties and responsibilities, reduced effort, and minimal engagement (Dowling vd., 2022; Güler, 2023; Özer, 2023).

This study aims to establish a conceptual and theoretical framework regarding employees' perceptions of quiet quitting by evaluating existing research in literature, enhancing the scholarly discourse on quiet quitting, analysing the concept of quiet quitting and its definitions, examining the theoretical framework proposed for quiet quitting.

Conceptual Framework

The concept of quiet quitting which gained prominence on social media during the Covid-19 pandemic and is viewed as an extension of the "Great Resignation" that significantly impacted organizations, has recently emerged as a nascent trend in both practice and theory.

The concept of quiet quitting lacks a clear and straightforward definition, with some researchers characterizing it as a “*anti-work philosophy*” while others

describe it as “*healthy boundary setting*” or “*a rejection of hustle culture and a serious approach to life*” (Keane, 2023; Yang and Ellis, 2022).

Although the concept of quiet quitting encompasses two elements, “quiet” and “quitting”, in this approach, employees do not entirely abandon their positions; rather, they merely meet the obligations outlined in their job descriptions without exceeding expectations (Acar, 2024; Scheyett, 2023).

Kont (2023) interprets quiet quitting as a behaviour linked to compensation, maintaining work-life balance, allocating personal time, resisting the demanding work pace, pursuing a fulfilling life beyond employment, disengaging from work, and merely completing assigned tasks. This phenomenon is described as a *response* to the hustle culture and employee burnout, particularly among those managing personal challenges after work (Savaş and Turan, 2023).

Kilpatrick (2022) defines quiet quitting as the restriction of responsibilities to those outlined in the job description, evasion of working hours necessary for job completion, maintaining a minimal performance level, and setting boundaries to improve work-life balance (Yıkılmaz, 2022).

Hetler (2022) defines quiet quitting as an *indicator* of employee dissatisfaction and burnout, proposing that individuals displaying this behaviour likely to neglect meetings, arrive late or depart early, contribute less to teamwork, and demonstrate diminished performance.

Harter (2022) describes individuals displaying quiet quitting behaviour as “*actively disinterested employees*” (Arar et al., 2023). Acar (2024) characterizes quiet quitting as “performing solely the designated tasks within specified working hours.”

Mert (2023) defines it as employees remaining in their organizations while refraining from engaging in activities that do not yield material or moral compensation. Wheller (2023) describes it as employees executing their duties exclusively within the confines of their prescribed job descriptions. Rogers (2023) characterizes it as fulfilling only the minimum expectations or contractual obligations of a position, while Nordgren and Björs (2023) depict it as employees performing solely the requisite tasks inside their organizations without exceeding those demands.

Palad (2023) asserts that quiet quitting entails a “*more covert separation*,” wherein employees persist in their physical duties while emotionally disengaging, as there are no “clear signs of resignation or withdrawal.” Kumar (2022) describes quiet quitting as a response to burnout, defining it as employees declining tasks outside their job descriptions, adhering to their work schedules, refraining from online engagement beyond working hours, neglecting email correspondence,

relishing weekends without technological reliance, recognizing the boundaries of their responsibilities, avoiding overextension of their duties, not performing the tasks of colleagues, and maintaining their health by mitigating burnout.

Kudhail (2022) asserts that employees undergoing the quiet quitting process neither quit their jobs nor sever their connections to their jobs. Quiet quitters perform their duties at a minimal level, refrain from leaving their positions, limit their efforts to only what is required, and meet their obligations sufficiently to avoid being fired, yet they remain emotionally disengaged from their work (Yoğurtçu et al., 2024).

The definitions of quiet quitting indicate that the concept typically involves *disconnection, dissatisfaction, and disappointment* between employees and their organizations, resulting in employees feeling internally alienated and lacking effort or initiative. Employees exhibiting quiet quitting syndrome act as though they have retired due to a "*psychological break*" from their organization, opting to cease meaningful contributions or, as Detert (2023) articulates, "*make moderate contributions*" while *covertly dissenting* against their organization (Cashion, 2024; Constantz, 2022; Demirgil, 2023; Echterhoff et al., 1997; Formica and Sfodera, 2022; Harter, 2022; Seçer, 2009; Tatlı, 2023).

Theoretical Framework

The concept of quiet quitting remains nascent and lacks widely acknowledged or a well-recognized theoretical framework in the literature. The phenomenon of quiet quitting, which has emerged globally since 2021, has been defined by numerous researchers through various approaches, discussed by diverse theoretical frameworks, and linked to distinct intra-organizational factors concerning employees' organizational behaviour.

This section encompasses theories, which seek to elucidate the quiet quitting behaviours or perceptions of employees within an organization, thereby laying the foundation for the theoretical framework of quiet quitting.

Yoğurtçu et al. (2024) ground quiet quitting in the "*Organizational Citizenship Behaviour Theory*." Employees exhibiting organizational citizenship behaviour—positive behaviours outside official job descriptions—assume greater responsibility and initiative for their organizations. When employees perceive a lack of appreciation for their dedication and sacrifices to their organizations, they suffer from emotional exhaustion, their commitment to the organization diminishes, leading to a process of quiet quitting (Bolino et al., 2015; Tsemach and Barth, 2022).

Gürer et al. (2024) posits that the "*Self-Determination Theory*" is efficacious in addressing quiet quitting behaviour. The theory explains the necessity for

employee commitment, job satisfaction, competence, autonomy, and relationship development, arguing that individuals ought to determine their own life choices and destinies. This notion posits that employees favour the autonomy to make independent judgments and govern their personal and professional lives (Battaglio et al., 2022; Deci & Ryan, 2000; Nordgren & Ingemarsson Björs, 2023; Van den Broeck et al., 2016).

Arar (2023) employs "*Conservation of Resources Theory, Social Exchange Theory, and Generational Theory*" as the theoretical framework for quiet quitting. When employees perceive a decline or threat to their resources (labour, personal attributes, abilities, knowledge, time, etc.) while doing their duties, they may respond to their organizations. According to Conservation of Resources Theory, employees displaying quiet quitting behaviour may engage in the quiet quitting process to avert additional resource depletion when they fail to attain the anticipated gains from their utilized resources (Hobfoll and Lilly, 1993; Hobfoll and Schumm, 2009; Hobfoll et al., 2016; Holmgreen et al., 2017).

Social Exchange Theory is based on the assumption that the relationship between an organization and its employees transcends a mere labour-wage transaction, evolving into a "*social exchange*" relationship founded on mutual benefits. In this social exchange, employees exhibit trust in the relational dynamics and endeavour to derive advantages that beyond their employment obligations. Employees demonstrating quiet quitting behaviour operate within the parameters of Social Exchange Theory, specifically concerning the expectations and reciprocity related to the fulfilment of their anticipated returns for the resources they expend (Blau, 1968; Cropanzano and Mitchell, 2005; Dienesch and Liden, 1986; Homans, 1958; Meira and Hancer, 2021; Ye et al., 2022).

The Generational Theory argues that individuals born within the same time frame exhibit analogous behavioural patterns, lifestyles, perspectives, attitudes, aspirations, and expectations, as well as comparable professional characteristics throughout their careers (Lower, 2008; Albayrak and Özkul, 2013). The generational cohorts include the Silent Generation (1925-1945), Baby Boomers (1946-1964), Generation X (1965-1979), Generation Y (1980-1994), Generation Z (1995-2012), and Generation Alpha (2013-2025). Generation Z is characterized by creativity, a departure from tradition, dissatisfaction, aggression towards authority, and honesty. This generation is referred to as Digital Natives, Media Generation, Com Generation, Internet Generation, Instant Online, and is anticipated to drive change and transformation in the workforce. (Akdemir et al., 2013; Akgündüz, 2021; Fox, 2011; Mücevher, 2021; Toruntay, 2011). Generations Y and Z, mostly comprising the current workforce, are posited to exhibit diminished organizational commitment and perceive their employment primarily as a source of income (Akgündüz, 2021; Crampton and Hodge, 2007;

Gabrielova and Buchko, 2021; Knight, 2009; Soni and Vohra, 2022; Strauss and Howe, 1991). It is often suggested that a substantial majority of employees displaying quiet quitting behaviour belong to Generations Y and Z. The similarity in behaviours and attitudes among these employees arises from their outlook on professional life, with Generation Z particularly notable for adopting and exhibiting quiet quitting behaviour (Pandey, 2022). Hamilton et al. (2023) contend that Generation X has experienced a reduction in working hours in the post-pandemic years and that employees from this generation often engage in quiet quitting. Human resources specialists assert that senior employees are more likely to engage in quiet quitting compared to their younger counterparts. It is assessed that older employees may experience a decline in motivation due to the necessity of acquiring new skills or assuming additional duties with the integration of younger employees into the organization (Phil, 2024).

Matias (2024) argues that “*Psychological Contract Theory, Engagement Theory, Adaptive Cost Theory, and Organizational Citizenship Behaviour Theory*” are complementary in the development of quiet quitting among employees. Psychological Contract Theory posits that a commitment is established between the organization and the employee, leading both parties to assume certain obligations. This constitutes an *implicit contract* encompassing the unarticulated expectations of employees regarding the terms of their relationship with the organization. The theory argues that employees' expectations within their organizations may evolve throughout their working hours, and when existing constraints are lifted, the resultant changes are interpreted by employees as a breach of the psychological contract (Akğündüz, 2021; Cihangiroğlu and Şahin, 2010; Rousseau, 1989; Rousseau, 1990; Rousseau, 2011).

Engagement Theory suggests that the alterations employees encountered upon returning to their workplaces post-Covid-19 pandemic resulted in diminished engagement compared to their online work experience during the pandemic, subsequently leading to reduced motivation for organizational advancement (Kahn, 1990; Rurkkhum & Bartlett, 2012; Saks, 2006). Adaptive Cost Theory posits that employees experienced psychological and physical exhaustion due to the swiftly evolving demands within their organizations since the onset of the pandemic, resulting in diminished internal resources to transcend their job roles (Cohen, 1978; Cohen, 1980).

Tath (2023) employs “*Agency Theory, Effort-Reward Imbalance Model, and Psychological Contract Theory*” to elucidate quiet quitting behaviour. Agency Theory argues that a contract exists between the principal and the agent, wherein the agent executes tasks as stipulated by the principal in exchange for a fee. Issues emerge between the organization and employees when the psychological contract

between the principal and the agent is breached (Fisch, 2003; Koçel, 2014). The Effort-Reward Imbalance Model emphasizes that effort and reward are critical determinants of organizational work structure. An imbalance arises when high effort is met with low reward, leading to employee stress, diminished performance, burnout, and an increased propensity for quiet quitting (Löhnert, 1990; Marmot et al., 1999, Siegrist, 1996).

Leone (2024) bases quiet quitting in the "*Multidimensional Burnout Theory*". The theory comprises three sub-dimensions: exhaustion, cynicism, and ineffectiveness. The theory predicts that the organizational work environment adversely affects employees' physical and mental health due to cynicism or desensitization, negatively influencing their individual traits, which consequently leads to diminished job satisfaction and disengagement from work (Martinez et al., 2020; Maslach and Schaufeli, 1993; Maslach and Leiter, 2016; Saloviita and Pakarinen, 2021).

Keane (2023) explains the mechanisms and rationale behind quiet quitting via the lens of "*the Job Demands-Resources Theory and Psychological Contract Theory*". The Job Demands-Resources Theory posits that an imbalance between job demands and resources within an organization leads to burnout, characterized by the aspects of "exhaustion and disconnection". The theory argues that when employees perceive organizational demands as detrimental to their work-life balance, they are likely to disengage, striving to modify their work through negligence, ineffective communication, and interpersonal discord (Bakker et al., 2023; Demerouti et al., 2001).

Atalay and Dağıstan (2024) use "*Equity Theory, Herzberg's Two Factor Theory, Expectation Theory, and Social Exchange Theory*" to explain quiet quitting. Equity Theory posits that when employees perceive their compensation, including salary, working conditions, and rights, as insufficient relative to their contributions, they recognize inequality and imbalance within the organization, resulting in diminished motivation. To rectify this disparity, employees may diminish their exertion or seek greater compensation (salary increase, advancement, etc.), work at a slower pace, exhibit reluctance to engage in decision-making, display diminished organizational commitment, and ultimately embark on a process of quiet quitting (Adams, 1963; Adams, 1965; Folger & Russell, 1998; Goodman & Friedman, 1971; Huseman et al., 1987; Smyth et al., 2021).

Herzberg's Two Factor Theory analyses employee demands in two categories: hygiene factors and motivating factors. Hygiene factors are the essential elements required in an organization, including pay, working conditions, fringe benefits, and job security. Motivating factors are elements that significantly influence employee motivation, including accountability, career advancement, and

professional growth. In situations where motivating factors are absent or hygienic factors are inadequate, it is possible for employees to tend to quietly quit (Herzberg et al., 1959; Herzberg, 1966). Expectancy Theory suggests that the effort employees exert in an organization is influenced by three fundamental factors: expectation (performance level), instrumentality (reward), and valence (individualized rewards). It is asserted that a decline in any of these factors will result in a corresponding decrease in employee motivation. To enhance employee motivation and avert quiet quitting, it is imperative to establish organizational justice and equitably distribute rewards that employees deem valuable (Vroom, 1964; Porter and Lawler, 1968).

Demirgil (2023), akin to Atalay and Dağistan (2024) and Arar (2023), argues that the theoretical foundation of quiet quitting is grounded in “Conservation of Resources Theory, Social Exchange Theory, Generational Theory, and Equity Theory”. Additionally, Justilien (2024) employed "Self-Construction Theory (individualism and collectivism), Social Learning Theory (internal and external locus of control), and Social Influence Theory (obedience, conformity, and compliance)" in his examination of the social factors influencing employees' quiet quitting within organizations.

Conclusion

In the context of the new normal following the Covid-19 pandemic, characterized by economic crises and paradigm shifts, it is evident that the final stage for employees prior to their departure from organizations is the phenomenon of quiet quitting.

Employees whose connection to their organization diminishes, whose commitment declines, and whose organizational silence escalates, subsequently engage in the quiet quitting process due to alienation from their work, the products they create, themselves, their colleagues, their organization, and even their surroundings over time.

Studies in the literature indicates that quiet quitting is a significant and critical tendency, characterized by protest and rebellion, which cannot be simplified to the notion that an employee merely meets job requirements and responsibilities to the minimum extent necessary to avoid termination, without exerting additional effort.

It is highlighted that employees may consciously and intentionally engage in quiet quitting behaviour to maintain good mental health, or to pursue activities they believe they have neglected in their personal lives due to the demands of their work and feelings of exhaustion.

The impact of the quiet quitting phenomena on employees across many generations and cultures in the context of the new normal remains a topic of investigation; nonetheless, it is unequivocal that Generation Z employees will garner significant attention.

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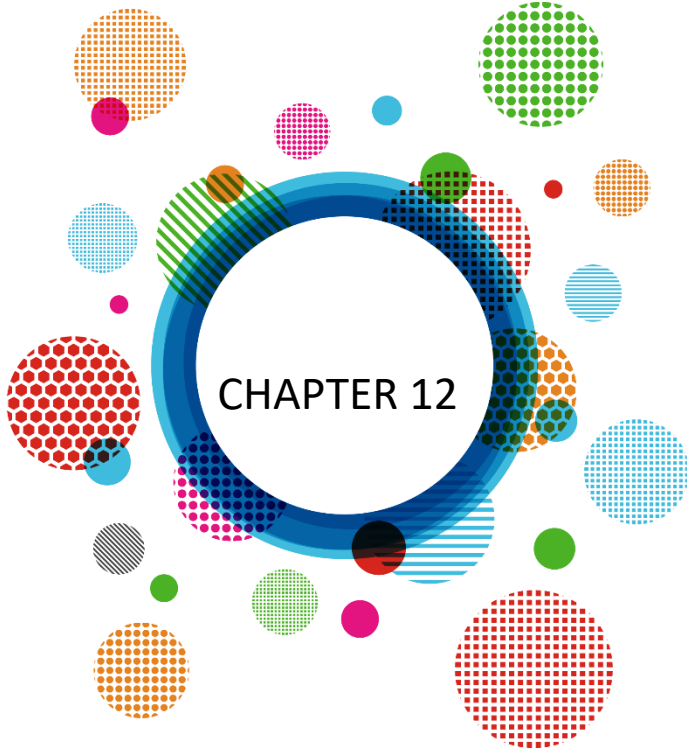
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**Variability and Trend in Monthly Maximum and
Minimum Temperatures of Niğde and Ulukışla,
Southeastern Central Anatolia, Türkiye**

Türkan Bayer-Altın¹

¹ Prof. Dr. Faculty of Humanities and Social Sciences, Department of Geography, Niğde
Ömer Halisdemir University, Niğde , Türkiye, 0000-0001-8692-1713

Introduction

The increase in global air temperatures caused by humans is 1.07°C from 1850-1900 to 2010-2019 (IPCC, 2021). The increasing trend in global average air temperatures since the last quarter of the 19th century differs by time and space. The greatest impact of climate change will be seen in countries located at the middle and high latitudes (Aydın and Karabulut, 2021).

In the mid-latitudes, winter precipitation may occur more as rain than snowfall in comparison to today, and there is the potential for stream flows originating in mountain areas to significantly change in both quantity and seasonality. These changes will significantly reduce water availability for the more densely populated plains below the mountain ranges (Beniston, 2003). When climate change discussions began in the late 1980s, estimations regarding the magnitude of warming under greenhouse gas scenarios claimed that global average temperatures might increase by $1.5\text{-}5^{\circ}\text{C}$ by the end of the 21st century (Beniston, 2003). Türkiye is located in the Mediterranean basin, which is one of the fastest-warming areas in the world. In particular, changes in annual average temperatures over the last 140 years have been higher than global average values, and annual average temperatures across the Mediterranean basin are now approximately 1.5°C higher than those recorded in the late 19th century (Lange, 2020). Regional climate model simulations for the Middle East and North Africa, which includes Türkiye, indicate that there will be an increase in average air temperatures ranging from 3°C to 9°C in the distant future (2070-2100) (Öztürk et al., 2018). Türkiye, particularly the Central Anatolia Region, is one of the regions that will be impacted by this change due to its geographical position.

An increasing trend in extreme and average temperature values was reported in many studies carried out on temperature changes and trends in this region and Türkiye (Türkeş et al., 1996, 2002; Türkeş, 1995, 2005; Demir et al., 2008; Tayanç et al., 2009; Bayer-Altın et al., 2012; Erlat and Türkeş, 2013; Kızılelma et al., 2015; Bayer-Altın et al., 2023a). In these studies, it was determined that the average, maximum, and minimum air temperature values in Türkiye, in line with global values, exhibited an increasing trend despite interannual variability. Türkeş et al. (2002) determined that the average air temperatures in Türkiye, particularly in the southern regions, exhibited an increasing trend in the period of 1929-1999 and decreased in the summer and autumn seasons in the northern and inland regions. Tayanç et al. (2009) examined the trends in maximum, minimum, and mean daily temperature time series of 54 stations in Türkiye for the period 1950-2004 and attributed the strong warming trend seen since the 2000s to urbanization. In the same study, it was also reported that minimum temperatures increased significantly in all regions of Türkiye in spring, summer, and autumn due to urbanization. Monthly average, maximum, and minimum air temperatures

in Türkiye were examined for the period 1950-2010, and a weak increasing trend was detected in temperatures (Türkeş et al., 2016). In a study examining the changes in monthly precipitation and temperature data for Türkiye for the period 1901-2014, the increasing trend in air temperatures in all regions coincides with the year 1993, and summer was determined to exhibit the highest increasing trend (Hadi and Tombul, 2018). The changes and trends observed in maximum, minimum, and average air temperatures and precipitation series in Türkiye were examined by Demir et al. (2008). In this study, the strongest increase in average air temperatures was observed in the summer season. Bayer-Altın (2017) examined the change and trend in annual and seasonal temperatures in Niğde for the period 1950-2015, and reported that the highest level of increases was observed in summer. The mean, minimum, maximum temperatures, and precipitation data obtained from meteorological stations in the Central Anatolia Region were examined for the period 1970-2010 by Kızılelma et al. (2015). They reported increases in mean, maximum, and minimum temperatures in the region. Bayer Altın (2023b) studied changes and trends in the temperatures of the Bor Plain and its near surroundings by using monthly mean temperature data. In this study, a significant increase ($p<0.01$) was found in the annual average temperatures of Niğde and Ulukışla for the period 1950-2018. Güler and Erhat (2023) examined the changes and trends in average annual and seasonal air temperatures for the period 1950-2022 in Türkiye and determined that the average air temperatures in Türkiye exhibited a strong increasing trend since 1998, as well as uninterrupted positive anomaly values after 2010. Bayer-Altın (2023a) analyzed the long-term (1960-2021) mean, minimum, and maximum temperatures in the Central Anatolia Region and determined that the warming trends were stronger in the stations in the southern parts of the region than in the stations in the north. In the same study, the average temperature trend was examined by subjecting it to the M-K test for September, October, and November, and a strong increasing trend was detected in the average temperature in September at all stations.

As can be seen, the number of studies on the temporal changes of the average air temperatures of the Central Anatolia Region, especially Niğde and its surroundings, in the last decade is very limited. In addition, almost all those studies used annual and monthly mean temperature data. Changes and trends in monthly average temperatures were not examined. Questions such as in which month the trend was stronger, or how many degrees of increase occurred, and in what direction this increase affected the increase and decrease of seasonal temperatures remain unanswered.

These two cities are important because their soil structure and climate conditions are suitable for potato production in Niğde and cherry production in

Ulukışla. Niğde ranks first in Türkiye in terms of potato cultivation area and production amount (Kılıç, 2016). Potato production is carried out in approximately 20% of the total irrigated agricultural land in Niğde and is the source of living for 5093 farmers (35% of total farmers) in 81 villages (51% of total villages) (Çalışkan et al. 2010, Aksoy et al. 2014). As stated by Akınerdem (2013), potatoes, an industrial plant, are affected by extreme temperatures and are exposed to diseases, agricultural pests increase, and product loss occurs. Even though there is no study on how global warming, which is a result of climate change, will directly affect potato production in Türkiye, there are studies evaluating the impact of temperature increases on global potato production in the world. During this period (temperatures are expected to increase by 2.1 to 3.2 °C for the period 2040-2069), global potential potato yields will decrease by 18% to 32% and 9% to 18% (Hijmans, 2003). Potato tuber germination and development are more sensitive to high temperature stress than photosynthesis (Reynolds and Ewing 1989; Ewing and Struik 1992). Changing planting time or location is less feasible at low latitudes, and global warming could have a strong negative impact on potato production in these regions (Hijmans, 2003). Rising temperatures can also negatively affect fruit growth. The flowering period is the most sensitive period for fruit growth to climate change due to reasons such as fewer cold winter days, advancement of the flowering date, risk of late frost during flowering, and unfavorable pollination conditions, including temperatures lower than 11°C and rain (Drogoudi et al., 2020). Cherries grown in mountainous regions such as Ulukışla may face the risk of earlier flowering and late frosts in this region. Considering the agricultural potential of Niğde and Ulukışla, it is very important to examine the changes in temperature data. This study aims to reveal the temporal changes in monthly maximum and minimum average temperatures in Niğde and Ulukışla during the period 1950-2023.

Geographic setting and current climate

Niğde and Ulukışla are located in the southeast of the Central Kızılırmak Sub-region of the Central Anatolian Region (Fig.1). Niğde is the central district of Niğde province and is located at 37° 57' east longitude and 34° 40' north latitude, with an average altitude of 1230 m. To the north are the volcanic Mt. Melediz (2963 m) and Mt. Keçiboyduran (2727 m), to the south are the foots of Mts. Bolkar consisting of sedimentary rocks of various ages and types and Mt. İtulumaz (2150 m) consisting of metamorphic rocks. To the east is a plateau deeply dissected by streams (Küçüköz creek and its branches), and to the west is the Bor plain. Niğde is located in a depression with faulted edges in this plateau area. Ulukışla is a district center in the south of Niğde province. Ulukışla is located in the northern foothills of the Mts. Bolkar, a part of the Central Taurus Mountains, and between 34° 16' east longitude and 36° 5' north latitude. Its

altitude above sea level is 1427 m. It is located at the intersection of the Mediterranean and Central Anatolia regions and surrounded by hills with altitudes ranging between 1500 m and 1660 m.

The annual mean temperature was 11.2 °C in Niğde during the period 1950-2023. The hottest month was July (22.4°C) and the coldest one was January (-0.2°C). The annual temperature is 25.5°C. The mean temperature of five months (January, February, March, November, and December) was below 7°C. Total annual precipitation was 330 mm. The lowest annual total precipitation was observed in July and August (<6 mm). The highest annual total precipitation was received in April, May, and December (42 mm, 43 mm, and 40 mm, respectively).

The annual mean temperature of Ulukışla was lower than that of Niğde. The annual mean temperature was 9.7 °C in Ulukışla during the period 1950-2023. The hottest month was July (21.3°C). The coldest month was January (-1.6°C). The annual temperature was 25.8°C. The mean temperature of six months (January, February, March, April, November, and December) was below 6°C. The annual total precipitation is 319 mm. The lowest precipitation was observed in July and August (6.6 mm and 4.5 mm, respectively), and the highest annual total precipitation in March, April, and May (35.0 mm, 48.1 mm, and 47.4 mm, respectively). Considering these temperatures and rainfall values, it can be stated that a semi-arid continental climate is dominant in both settlements. Considering these temperatures and rainfall amounts, a semi-arid continental climate prevails in both settlements. This result is consistent with the studies on the climate of the southern part of the Central Kızılırmak Sub-region, which was defined as continental semi-arid in these studies (Türkeş, 2012; Kızılelma vd., 2015; Bayer-Altın, 2017, 2019).

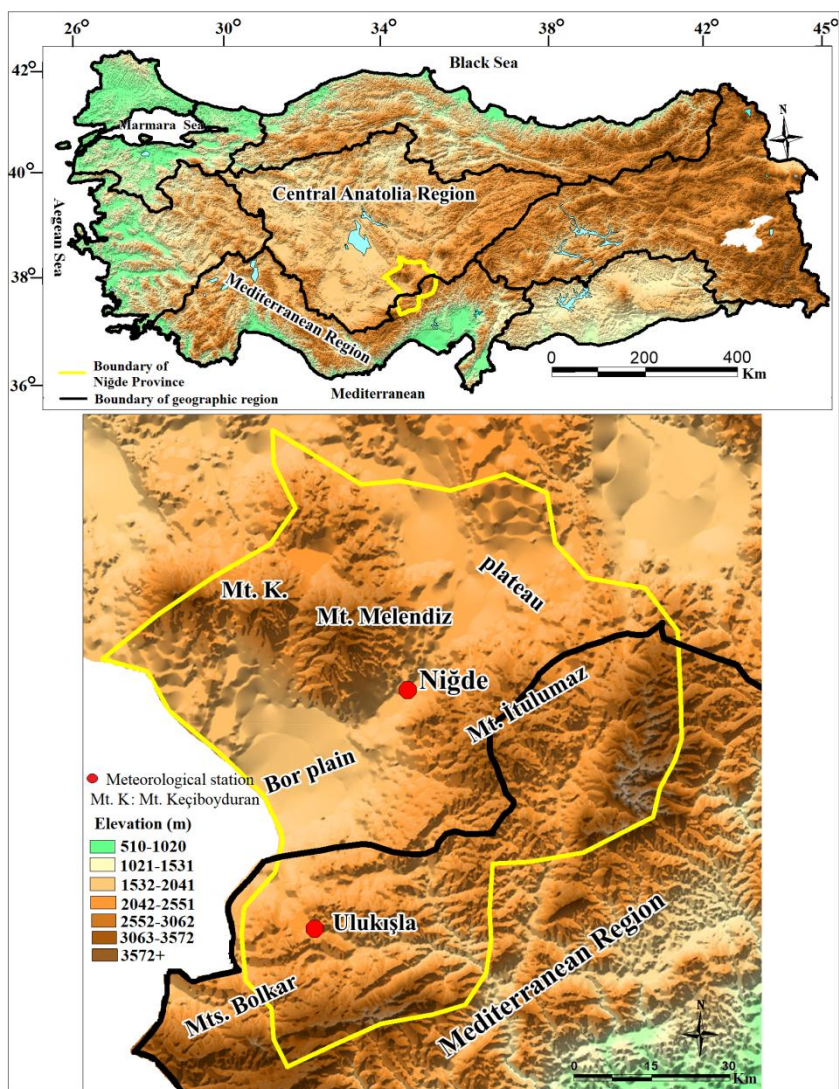


Fig.1 Location of Niğde and Ulukışla meteorological station

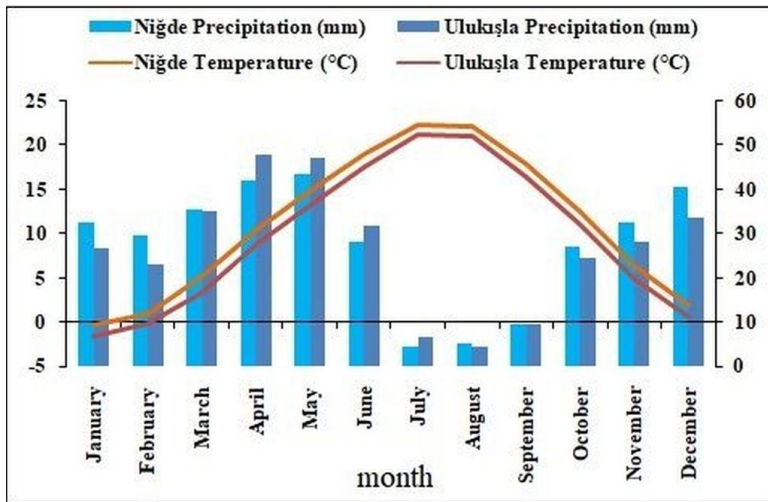


Fig. 2 Monthly mean temperature and precipitation values of Niğde and Ulukışla over the period 1950-2023. Temperature and precipitation data were obtained from the Turkish State Meteorological Service (MGM, 2023).

Data and Methods

This study was carried out utilizing the temperature dataset consisting of monthly average maximum and minimum temperatures (°C) obtained from two stations, Niğde and Ulukışla (see Fig. 1), of the Turkish State Meteorological Service for 74 years from 1950 to 2023. Average maximum and minimum temperature series were analyzed for twelve months by subjecting them to the M-K test for trend analysis, Kruskal-Wallis test for homogeneity, and coefficient of variation for inter-annual variability.

The Mann-Kendall test is a nonparametric statistical method. It is a special application of Kendal's test, which is known as Tau (WMO, 1966). In this method, the data are ranked from smallest to largest. H_0 hypothesis states that the ranked series ($X_1, X_2, \dots, X_n$) are random variables that are independent of time and have similar distributions. H_1 alternative hypothesis states that the distribution of consecutive data values X_k and H_j in the series is not similar, where $k = j$ and $n \geq k, j$ (n : data record length). In other words, there is a linear trend in the series. As a basic rule in interpretations of time series plots of $u(t)$ and $u'(t)$ values obtained from the sequential analysis of the M-K test, where the $u(t)$ curve indicates the direction of the trend, superposition of $u(t)$ and $u'(t)$ curves for a number of times suggests that there is no trend in the series. However, the point where $u(t)$ and $u'(t)$ curves intersect is considered the point where a strong trend begins or where a change occurs in the series (Sneyers, 1990; Türkeş, 1996, 1999; Türkeş et al., 2002). After such a point of change, the areas outside the 95% confidence limits of the $u(t)$ curve, depending on the two-sided shape of

the normal distribution (here, the critical values of ± 1.96), are considered periods of significant increase (decrease). M-K test was used for all trends with a significance level of 0.05, 0.01 and 0.001.

In the Kruskal-Wallis homogeneity test, means and variance analysis were used to determine the homogeneity of the data (Sneyers, 1990; Türkeş, 1996; Türkeş et al., 2002). The reason for preferring this test is that the data generally does not show a normal distribution. Inhomogeneity refers to strong, abrupt, or step-like changes in the mean of a series that are not climatological (or natural) (Türkeş et al., 2002). It is a very useful tool to decide whether a statistically significant inhomogeneity in a series (particularly with a probability of <0.01) is due to a non-climatological sudden or natural low-frequency fluctuation or a strong persistence (Türkeş, 1995, 1996). A non-climatological abrupt change in the mean of a series may originate either from an abrupt change related with a change in the location of a station or from a trend resulting from other factors such as urbanization and a heat source. Therefore, 8 periods of 9 years were separated from the 74-year time series, the Kruskal-Wallis H value of the groups was obtained, and hypothesis testing was performed. The hypothesis test of the H value is performed considering the X^2 distribution with k-1 (k refers to the number of groups) degrees of freedom. X_k and X^2 were compared, and in this comparison, the critical values for X^2 were determined to be 14.07 and 18.48, corresponding to a significance level of 0.05 and 0.01 in the chi-square table, respectively. Exceeding the critical value indicates heterogeneity (inhomogeneity).

Coefficient of variation (CV %)

The variability in temperature series was tested by using the coefficient of variation (CV) method. CV (%) is the ratio of the standard deviation to the monthly long-term average temperature, and the result is multiplied by 100 (Equation 1).

$$CV = (\sigma / X_{\text{mean}}) \times 100 \quad \text{Equation (1)}$$

Where CV refers to the coefficient of variation, σ to the standard deviation of the temperature series ($^{\circ}\text{C}$), and X_{mean} to the long-term average of the temperature series ($^{\circ}\text{C}$). A temperature variability rate close to the long-term average value is an indicator of low year-to-year variability in the temperature series, whereas a value far from the long-term average of the observations constituting a series is considered an indicator of high year-to-year variability in that observation series (Türkeş, 2005). Since there were negative values in the average and average minimum air temperature series of winter months, the CV values calculated for these months were not used in this study.

Results

Monthly average maximum temperature coefficient variation (CV)

As seen in Fig. 3a, the monthly average maximum temperature CV varies between 5% (August) and 26% (January) in Niğde, followed by February with a CV of 25%. The CV value of December is 20%. The CV values of the spring temperatures vary between 8% (May) and 17% (March) and are 10% in April. The CV values of the summer temperatures are low and range between 5% (August) and 6% (June and July). The CV values of September, October, and November are 6%, 8%, and 12%, respectively.

In Ulukışla, similar to Niğde, the CV values of maximum temperatures are the smallest in summer and the largest in winter (Fig. 3b). The CV value of maximum temperatures in winter in Ulukışla is between 25% (December) and 30% (January). The CV values of the spring temperatures range from 10% (May) to 19% (March) and are 12% in April. The CV values of the summer temperatures are low and range between 5% (August) and 7% (June) and are 6% in July. The CV values for September, October, and November are 6%, 9%, and 14%, respectively.

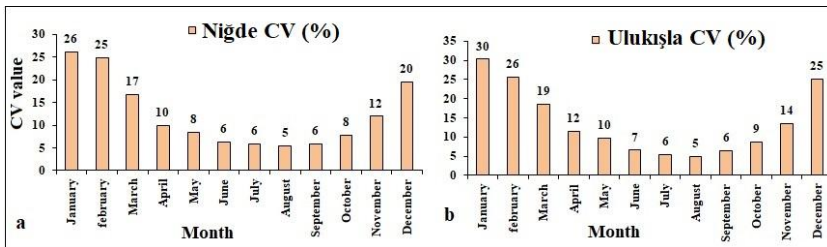


Fig. 3 CV value (%) of monthly average maximum temperature for the period 1950-2023.

Kruskal-Wallis homogeneity test results of monthly average maximum and minimum temperatures

Examining the Kruskal-Wallis homogeneity test results of the monthly average maximum temperatures in Niğde, it was determined that the averages for winter and summer months were inhomogeneous in Niğde (Table 1). Those of the spring months were homogeneous, except for May, whereas the averages of the autumn months were homogeneous. Examining the homogeneity test results of monthly average maximum temperatures, it can be seen that the variances were homogeneous for most months, except for November. The Kruskal-Wallis homogeneity test results of the monthly average minimum temperature for Niğde indicate that the averages were homogeneous for most months, whereas those for winter months were homogeneous (Table 2). The averages for spring months

were homogeneous, except for May, while those of summer months were inhomogeneous. Besides, the averages for the autumn months were homogeneous, except for November. The variances were found to be homogeneous for all months, except for June. In Niğde, in-homogeneity was found in the means at the 0.05 significance level in the maximum temperatures in January, February, December, May, June, and July, except for August (at 0.001 level).

Table 1. The Kruskal-Wallis homogeneity test results of the monthly average maximum temperatures of Niğde.

Station: Niğde	Kruskal	Wallis	Test	
Parameter: Max Temperature	Homogeneity method	Xk	Critical value	Result
Time				
January	mean	16.91*		in-homogen
	variance	6.61		homogen
February	mean	18.43*		in-homogen
	variance	6.22		homogen
March	mean	5.73		homogen
	variance	11.41		homogen
April	mean	4.40		homogen
	variance	6.88		homogen
May	mean	18.15*		in-homogen
	variance	4.78		homogen
June	mean	14.87*	14.08	in-homogen
	variance	4.50	18.48	homogen
July	mean	17.02*		in-homogen
	variance	10.64		homogen
August	mean	24.14**		in-homogen
	variance	6.94		homogen
September	mean	11.97		homogen
	variance	7.57		homogen
October	mean	7.16		homogen
	variance	4.95		homogen
November	mean	11.27		homogen
	variance	17.88*		in-homogen
December	mean	18.43*		in-homogen
	variance	3.99		homogen
* significant at 0.05 level	** significant at 0.01 level			

Table 2. The Kruskal-Wallis homogeneity test results of the monthly average minimum temperatures of Niğde.

Station: Niğde	Kruskal	Wallis	Test	
Parameter: Min. Temperature	Homogeneity method	Xk	Critical value	Result
Time				
January	mean	4.96		homogen
	variance	5.75		homogen
February	mean	11.68		homogen
	variance	7.74		homogen
March	mean	10.12		homogen
	variance	2.85		homogen
April	mean	12.32		homogen
	variance	9.61		homogen
May	mean	29.28**		in-homogen
	variance	13.29		homogen
June	mean	35.80**	14.07	in-homogen
	variance	19.61**	18.48	in-homogen
July	mean	34.91**		in-homogen
	variance	13.67		homogen
August	mean	36.12**		in-homogen
	variance	9.02		homogen
September	mean	16.82*		in-homogen
	variance	3.35		homogen
October	mean	13.01		homogen
	variance	11.37		homogen
November	mean	13.69		homogen
	variance	4.35		homogen
December	mean	8.17		homogen
	variance	6.71		homogen
* significant at 0.05 level	** significant at 0.01 level			

Tables 3 and 4 present results of the homogeneity tests to determine if the long-term maximum and minimum temperature series are homogenous for Ulukışla. The results indicated that the averages of February, August, September, and December were found to be in-homogeneous in Ulukışla, while other months were homogeneous. Examining the homogeneity test results of monthly maximum temperatures, it was determined that the variances were homogeneous for most months, except for May. The Kruskal-Wallis homogeneity test results of the monthly average minimum temperature data of Ulukışla indicate that the averages were homogeneous for most months (Table 4). The averages were in-homogeneous for winter months, except for January, and spring months were homogeneous, except for March. Homogeneity results also indicate that the averages were in-homogeneous for summer months, whereas autumn months were homogeneous, except for September. Homogeneity results of the variances revealed that autumn months (September, October, and November) and

December were in-homogeneous, whereas other months were homogeneous. There was in-homogeneity in the for summer months at the 0.01 significance level in the minimum temperatures in May, June, July, and August, except for September (at 0.05 levels).

Table 3. The Kruskal-Wallis homogeneity test results of the monthly average maximum temperatures at Ulukışla.

Station: Ulukışla	Kruskal	Wallis	Test	
Parameter: Max Temperature	Homogeneity method	Xk	Critical value	Result
Time				
January	mean	7.35		homogen
	variance	12.34		homogen
February	mean	14.14*		in-homogen
	variance	5.93		homogen
March	mean	5.12		homogen
	variance	7.43		homogen
April	mean	7.59		homogen
	variance	4.97		homogen
May	mean	10.23		homogen
	variance	14.22*		in-homogen
June	mean	11.24	14.07	homogen
	variance	5.93	18.48	homogen
July	mean	10.97		homogen
	variance	7.12		homogen
August	mean	17.86*		in-homogen
	variance	11.29		homogen
September	mean	15.40*		in-homogen
	variance	9		homogen
October	mean	8.58		homogen
	variance	5.09		homogen
November	mean	6.94		homogen
	variance	11		homogen
December	mean	19.51**		in-homogen
	variance	7.21		homogen
* significant at 0.05 level	** significant at 0.01 level			

Table 4. The Kruskal-Wallis homogeneity test results of the monthly average minimum temperatures of Ulukışla.

Station: Ulukışla	Kruskal	Wallis	Test	
Parameter: Min. Temperature	Homogeneity method	Xk	Critical value	Result
Time				
January	mean	8.17		homogen
	variance	7.21		homogen
February	mean	16.30*		in-homogen
	variance	12.97		homogen
March	mean	12.08		homogen
	variance	10.34		homogen
April	mean	17.50*		in-homogen
	variance	5.10		homogen
May	mean	29.64**		in-homogen
	variance	10.16		homogen
June	mean	32.36**	14.07	in-homogen
	variance	9.05	18.48	homogen
July	mean	38.11**		in-homogen
	variance	12		homogen
August	mean	36.35**		in-homogen
	variance	13.91		homogen
September	mean	15.39*		in-homogen
	variance	17.13*		in-homogen
October	mean	10.36		homogen
	variance	15.00*		in-homogen
November	mean	11.84		homogen
	variance	7.89		in-homogen
December	mean	5.41		in-homogen
	variance	2.86		in-homogen
* significant at 0.05 level		** significant at 0.01 level		

Trend in monthly maximum and minimum temperature series

Given the time series of monthly average maximum temperature data for Niğde, it was found that there was an increasing trend in temperature in some months and a decreasing trend in some others (Table 5). While a statistically insignificant increasing trend was observed in January and February, there was a statistically insignificant decreasing trend in December. Examining the average maximum temperatures of the spring months, there was an insignificant increasing trend in March and April, whereas a weakly significant increasing trend was observed in May, as well as a significant increasing trend in summer months at the 0.05 and 0.01 levels. On the other hand, in autumn, a statistically significant (at 0.05 level) increase was observed in September, and a insignificant increase and decrease trend was observed in October and November, respectively. The increasing trend in maximum temperatures started in May,

June, July, August, and September in the years 1992, 1987, 1996, 1998, and 1991, respectively.

Results of the M-K trend analysis conducted for minimum temperatures over the period 1950-2023 in Niğde are presented in Table 5. Given the results of the trend analysis of monthly minimum temperatures in Niğde, the increasing trend in minimum temperatures was stronger than the trend in maximum temperatures. Even though there was a significant increase in temperature at the 0.05 level in February and December, an insignificant increasing trend was detected in January. A significant increase in the minimum temperatures was observed in March and April at the level of 0.01. While there was a significant increasing trend in temperature at 0.001 level in May, summer months, September, and October, there was a significant increasing trend at the level of 0.05 in November.

Table 5. M-K analysis results of monthly maximum and minimum temperatures of Niğde

Station: Niğde	Mann	Kendal	Test	
Time	parameter	u(t)	SUT	TD
January	max temperature	1.26		O
	min temperature	1.82*	2018	↑
February	max temperature	1.06		O
	min temperature	2.03*	2018	↑
March	max temperature	0.32		O
	min temperature	3.08**	2016	↑
April	max temperature	0.15		O
	min temperature	3.30**	2017	↑
May	max temperature	2.45*	1992	↑
	min temperature	3.94***	2011	↑
June	max temperature	2.68**	1987	↑
	min temperature	6.17***	2008	↑
July	max temperature	2.38*	1996	↑
	min temperature	5.78***	2001	↑
August	max temperature	3.07**	1998	↑
	min temperature	4.59***	2008	↑
September	max temperature	1.71*	1991	↑
	min temperature	4.24***	2004	↑
October	max temperature	0.88		O
	min temperature	3.80***	2015	↑
November	max temperature	-0.41		O
	min temperature	2.53*	2020	↑
December	max temperature	-0.05		O
	min temperature	1.83*	2020	↑
* significant at 0.05 level ** significant at 0.01 level *** significant at 0.001 level				
SUT: the start of uptrend in temperature TD: trend direction				
O: statistically insignificant increase or decrease				

Table 6 presents the results of the M-K test, revealing the trend in the maximum temperatures for Ulukışla. In Ulukışla, an insignificant increase (January and February) and decrease (December) trend were observed in winter maximum temperatures. Even though there was an insignificant increase in the maximum temperatures of March and May, an insignificant decrease was observed in the maximum temperatures of April. In addition, there was an increasing trend at the 0.05 level in the maximum temperatures of June and August, as well as an insignificant increase in the maximum temperatures of July. Even though an insignificant increasing trend was observed in the maximum temperatures in September and October, there was a significant decreasing trend at the 0.05 level in the maximum temperatures in November. A statistically significant increasing trend was found in June and August maximum temperatures in Ulukışla from the year 1986 and 2004, respectively

Given the M-K analysis results, a statistically significant increasing trend was observed in minimum temperatures of all months at 0.05, 0.01, and 0.01 levels, except for December (Table 6). There was an increasing trend in the minimum temperatures in January and February at a statistical significance level of 0.01 and 0.05, respectively, and the trend started in the year 2018 for both months. A strong increasing trend was observed in the minimum temperatures of spring and summer months, respectively, at a statistical significance level of 0.01. The increasing trend started in spring and summer in the mid and early 2000s, respectively. While significant increases were observed at the levels of 0.001, 0.05, and 0.01 in the minimum temperatures in September, October, and November, respectively, the increasing trend started in 2009 for September and 2019 for October and November.

Table 6. M-K analysis results of monthly maximum and minimum temperatures of Ulukışla.

Station: Ulukışla	Mann	Kendal	Test	
Time	parameter	u(t)	SUT	TD
January	max temperature	0.22		O
	min temperature	2.93**	2018	↑
February	max temperature	0.009		O
	min temperature	2.37*	2018	↑
March	max temperature	0.68		O
	min temperature	3.39***	2014	↑
April	max temperature	-0.21		O
	min temperature	4.00***	2010	↑
May	max temperature	1.27		O
	min temperature	4.07***	2011	↑
June	max temperature	1.99*	1986	↑
	min temperature	5.32***	2012	↑
July	max temperature	0.94		O
	min temperature	6.99***	1997	↑
August	max temperature	1.75*	2004	↑
	min temperature	5.95***	2003	↑
September	max temperature	0.97		O
	min temperature	4.39***	2009	↑
October	max temperature	0.36		O
	min temperature	2.55*	2019	↑
November	max temperature	-1.71*	2020	↓
	min temperature	2.86**	2019	↑
December	max temperature	-0.40		O
	min temperature	0.76		O
* significant at 0.05 level	** significant at 0.01 level	***	significant at 0.001 level	
SUT: the start of uptrend in temperature			TD: trend direction	
O: statistically insignificant increase or decrease				

Discussion

At both stations, the CV ratios of maximum temperatures were found to be at the lowest level in summer and at the highest in winter. These results are consistent with those reported by Türkeş (2005). In the Cappadocia vicinity, the interannual variability of summer maximum temperatures was small at all stations, and the CV ratios varied between approximately 3.4% (Aksaray) and 4.4% (Nevşehir). In Niğde and Ulukışla, the variability of summer maximum temperatures was also low, but varied between 5% and 7%. In the study examining the temperature variability for the period 1950-2018 and 1960-2021 (Bayer-Altın, 2019, 2023a), the summer temperature variability of Niğde was found to be 5%. This finding is also consistent with the temperature variability of Niğde for the period 1950-2023. These results suggest that the maximum values

in Niğde and Ulukışla do not deviate from the average value in the summer months, whereas the opposite situation was observed in the winter months.

It indicates that there is a general slight increase in monthly average maximum temperatures and a strong increase in minimum temperatures in Türkiye and Central Anatolia. These findings are consistent with the trends in monthly average maximum and minimum temperatures in Niğde and Ulukışla. In a study, which includes the monthly averages of daily maximum air temperatures recorded during the period 1929-1999 (Türkeş, 2002), it was determined that spring maximum temperatures showed a decreasing trend in the Central Anatolia Region. In the same study, although the winter maximum temperature series were generally characterized by high-frequency oscillations, the negative serial correlation coefficients found in these series were not significant. Most of the winter temperatures were also random against any trend. A slightly significant increasing trend was found in winter maximum temperatures for the period 1952-2006 for the Central Anatolia Region (Demir et al., 2008). A weak increasing (January and February) and decreasing (December) trends were determined in winter maximum temperatures in Niğde and Ulukışla, indicating that there was still a non-significant increasing trend in the winter months. In a study examining seasonal maximum temperatures for the period 1970-2010 (Kızılelma et al., 2015), significant increases were found for Niğde and Ulukışla. The trend in maximum temperatures in the spring in Niğde and Ulukışla is similar to the trend observed in the winter months. In other words, a slight increase and decrease trend was observed in the spring. Kızılelma et al. (2015) reported positive trends in spring maximum temperatures in Niğde and Ulukışla. It was because this was statistically strong increasing trend in May maximum temperatures since maximum temperature in May, especially in Niğde, was statistically significant for the period 1950-2023, and the beginning of the significant increasing trend was 1992. The increasing trend in air temperatures covering all regions gained importance after 1993 (Hadi and Tombul, 2018). Bayer-Altın (2017) examined the change and trend in annual and seasonal temperatures in Niğde for the period 1950-2015, and negative anomaly values were observed between 1982 and 1993, whereas there were positive anomaly values since 1993. Statistically significant increases in the maximum temperatures of summer months in Niğde and Ulukışla for the period 1950-2023 are consistent with previous studies. Kızılelma et al. (2015) pointed out that there was a statistically significant increasing trend in summer temperatures in Niğde, and the summer season was significant at the 95% confidence interval at all stations, except for Ürgüp, in Central Anatolia. Significant increasing trends at the 0.01 level were detected in the summer temperature series of Niğde and Ulukışla by Bayer-Altın (2023a). The strong increasing trends in August (Niğde) and June (Ulukışla) contribute to these temperature increases. Demir et al. (2008) found that the increase in summer

maximum temperatures was not strong for the period 1952-2006 in the southern part of Central Anatolia. The increasing trend in June in Niğde and Ulukışla started in 1987 and 1986, respectively. The maximum temperature series showed a slight increasing trend in other months, except for November, but there was no significant increase in the period 1950-2023 in Niğde and Ulukışla. A strong increasing trend at the 0.01 level in autumn temperature was observed in the stations, which are located in the middle and southern parts of the region. This strong increasing trend detected for the autumn season was due to the statistically significant increasing trend in September temperatures. For the period 1950-2023, the increase in September maximum temperatures, especially in Niğde, was significant at the 0.05 level. Bayer-Altın (2023a) reported that the high temperatures seen in the summer months in the Central Anatolia Region continued in September, suggesting that the duration of the summer season was extended. In the same study, while the annual average temperature throughout the region varied between 10.3 °C and 10.5 °C in the period 1960-1990, the temperature increased to 2 °C and 2.5 °C in the period 1991-2021 and reached 12.0 °C and 12.2 °C. Bayer Altın (2023b) detected a 2°C increase in annual mean temperatures in Ulukışla and Niğde in the last 15 years (2004-2018). In this study, seasonal mean temperatures of Niğde and Ulukışla were examined, and it was determined that summer temperatures in Niğde and Ulukışla increased by 2.8°C and 1.9°C, respectively, in the last 15 years. According to Türkeş et al. (2002), autumn maximum temperatures for the period 1929-1999 showed a slight decreasing trend in the Central Anatolia Region. In general, the slight decreasing trend in autumn temperatures found in the Central Anatolia Region can be associated with significant or insignificant increasing and decreasing trends in November temperatures. Especially in Ulukışla, a significant decreasing trend was found at the level of 0.05 in November maximum temperatures for the period 1950-2023. This also applies to Niğde November maximum temperatures, but the decreasing trend was not strong. The statistically significant increasing trend in the minimum temperatures of Niğde and Ulukışla for the period 1950-2023 is consistent with the results reported in previous studies on minimum temperatures (Türkeş et al., 2002; Türkeş, 2005; Demir et al., 2008; Kızılelma et al., 2015). In the period between 1929 and 1999, average air temperatures in Türkiye showed an increasing trend, particularly in the southern regions, while there was a decrease in the northern and inland regions during summer and autumn (Demir et al., 2008). For the period 1950-2023, the increasing trend in minimum temperatures in Ulukışla, except for December, and in Niğde in all months was statistically significant. Considering the temperature observations from 54 stations in Türkiye for the period 1950-2004, minimum temperatures increased significantly in all regions in spring, summer, and autumn seasons, especially due to urbanization (Tayanç et al., 2009). Monthly average maximum and minimum

air temperatures in Türkiye exhibited a weak increasing trend during the period 1950-2010. After 1980, the increase observed was determined to be 0.19°C in average temperatures, 0.33°C in maximum temperatures, and 0.34°C in minimum temperatures (Türkeş et al., 2016). The strongest increasing trend in minimum temperatures in Niğde and Ulukışla in terms of monthly averages belongs to the summer season, consistent with the results of previous studies (e.g. Türkeş et al., 2002; Demir et al., 2008; Güler and Erlat, 2023). The reason for the statistically significant increasing trend in the summer season in Niğde and Ulukışla is that there was the statistically significant (at 0.01 level) increasing trend observed in minimum temperatures in all summer months. The increasing trend in minimum temperatures started earlier in the summer months in comparison to other months and coincided with the early 2000s. Average summer air temperatures exhibited a significant increasing trend since 1998, and there were uninterrupted positive anomaly values after 2010 (Güler and Erlat, 2023). The significant warming trend in this season is compatible with Türkiye being exposed to more frequent and longer heat waves (Erlat et al., 2021). In Niğde and Ulukışla, the most significant warming trend in minimum temperatures after summer months was observed in the spring months' minimum temperatures. Statistically, there was a strong increasing trend (at 0.01 and 0.001 levels) in the minimum temperatures of spring months. Minimum temperatures increased significantly after 2010. This result is consistent with the results reported by Güler and Erlat (2023). As emphasized in their study, in the spring season, when the strongest warming trend in average temperatures was observed after the summer season, air temperatures increased significantly after 2000 and remained higher than the reference period average. Autumn also had a statistically significant warming trend in minimum temperatures in Niğde and Ulukışla. The strongest increasing trend was observed in September in both Niğde and Ulukışla, followed by October (at Niğde) and November (at Ulukışla). There has been a significant increase in seasonal average temperatures, particularly in autumn, after 2007 in the period 1950-2022, and the highest seasonal averages in the last 73 years were observed after 2010 (Güler and Erlat, 2023).

Heat waves are also known to affect the increase in minimum and maximum temperatures. According to the Climate Change Action Plan of the Republic of Türkiye, it is estimated that the annual average temperature in Türkiye will reach 5°C in the inland regions in the coming years (ÇŞİB, 2024). In July 2000, the dominance of the anticyclonic anomalous circulation in the east of Russia and Anatolia at the 500 hPa standard pressure level and the warm-humid air mass moving towards Türkiye caused the temperatures to exceed 40°C at many stations, and the record-high temperature values were measured (Erlat and Türkeş, 2015). Considering the results, it was determined that temperatures in August increased by an average of 0.23°C per decade for the period 1950-2022,

the warming trend in August became evident from the mid-1980s, and the highest value of 25.0°C was observed in 2010 during the period examined (Güler and Erlat, 2023). In August 2023, a heat wave was experienced over a wide area in Türkiye (MGM, 2023). Record-high temperatures were detected at many stations. Heat waves were 5°C and above the 1991-2020 average and lasted for 5-10 days at 22 stations in the central and inner western parts of Türkiye (MGM, 2023). One of these stations is Aksaray, which is 88 km away from Niğde. Aksaray was affected by a heat wave that lasted 8 days in August 2023 (MGM, 2023). It is essential to develop local and regional action plans to combat heat waves and heat island effects. However, the variables that we will express as the socio-economic structure and environmental conditions of the city should be taken into consideration in the plans to be prepared (Çağlayan and Kayaer, 2024).

Conclusions

In this study, the temporal changes in monthly average maximum and minimum temperatures in Niğde and Ulukışla during the period 1950-2023 were investigated using Kruskal-Wallis homogeneity and M-K tests. When interpreting Kruskal-Wallis homogeneity test results, inhomogeneous stations were taken into consideration, and the change in the environmental conditions of the station was primarily observed. The high X_k values in the maximum temperature averages of the winter months in Niğde and Ulukışla indicate that there is a stronger shift to inhomogeneity at the level of 0.01 in the warm period at these stations. The location of Niğde and Ulukışla stations has not been changed since 1950. The situation that disrupts the homogeneity, particularly in maximum and minimum temperatures, may be due to a strong warming trend. Indeed, the inhomogeneity of the means in Niğde and Ulukışla in the summer and winter is related to a strong warming trend. This finding was also proven by employing the M-K test. The M-K test indicates that the increase in minimum temperatures in all months during the period 1950-2023 is stronger than the increase in maximum temperatures. In Niğde, there is an increasing trend (at the 0.01 level) in the minimum temperatures in March and April, while there is an increasing trend (at the 0.001 level) in the minimum temperatures from May to October. In Ulukışla, while there is an increasing trend of 0.001 levels in minimum temperatures from March to September, there is an increasing trend (at 0.01 level) in January and November, and an increasing trend (at 0.05 level) in February and October. Given the results of the M-K test, the statistically significant increasing trend in maximum temperatures in Niğde started earlier than the significant increasing trend in minimum temperatures and coincides with the end of the 1980s and the beginning of the 1990s.

The trends observed in monthly average maximum and minimum temperatures in Niğde and Ulukışla are an important indicator of the effects of

climate change on the climate system since 1950. For an urban settlement with a population of 372,000, there would be an increase in temperature due to urbanization; however, it is not the case for Ulukışla, which is a rural settlement with a population of 5929, indicating that in addition to urbanization, the atmospheric circulation pattern affects the global temperature in a way that increases it and may lead to an increase in the temperatures in Niğde and Ulukışla. On the other hand, the strong increase in January and February minimum temperatures in Ulukışla should be considered, and a frost protection strategy should be developed during the flowering season regarding the risk of earlier flowering and the impact of late frosts on these flowers. The same applies to potato cultivation in Niğde. It is essential to plant heat-resistant potato varieties in regions where temperatures are increasing, such as Niğde, to alleviate the effects of global warming.

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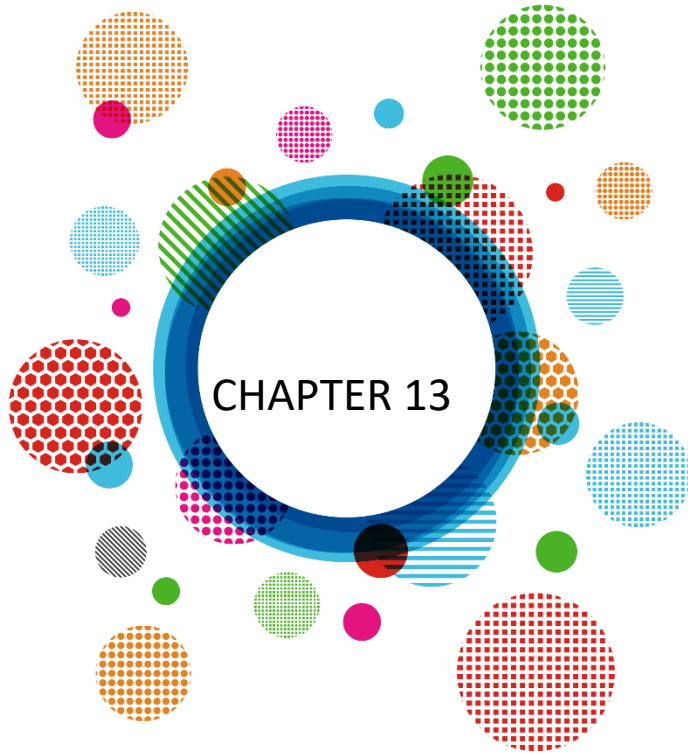
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Types of Female Genital Mutilations and Procedures

Carlos Savio Grassi Feitosa Cersosimo¹ & Başak Özoral²

¹

² Prof. Dr.

1. Introduction

Over the years, female genital mutilation (also known by the acronym FGM) has crossed its long-established geographical borders due to the continuous migration from places where it is not only accepted as part of the tradition but also as a religious imposition. This thesis attempts to produce evidence that FGM has no links to any religion and that it belongs to a millenary tradition, but overall, that it causes numerous short, medium, and long-term physical and psychological irreversible problems for the women. It also puts a spotlight on the problems that a woman and her family will face if this mutilation does not take place on her body.

It should be well understood that FGM is practiced not only by some Muslims in Africa, but even if in a lesser percentage, by followers of different religions.

Most of the countries where FGM is practiced are in the Horn of Africa: Somalia, Eritrea, Ethiopia, and Djibouti, but also in adjacent countries such as Egypt and Sudan. In some of these countries, cases of mutilation reach 98% of the female population. Even in West African countries such as Guinea, Mali, and Sierra Leone, the numbers can be around 90%. In addition to these countries, although in a lower percentage, there are some countries in sub-Saharan Africa.

Outside of Africa, Middle Eastern countries such as Yemen, Oman, and Saudi Arabia have their share of infibulation with percentages that can reach 2% of the population. In truth, Yemen has a percentage that reaches 5% of the female population. The Far East (Malaysia, Indonesia, India, and Pakistan) has its share of infibulation too, but with lower numbers. Not even Europe and the Americas, as well as Australia and New Zealand are immune to the mutilating “cut”.

This study will take into account countries with a high percentage (70% to 98%) of the female population who have been subjected to this kind of mutilation due to religion, tradition, or social obligations. It is also important to bear in mind that not all women and children see this mutilation with horror. Some are grateful to their mothers and are willing to practice it on their children. This fact must force our society to understand that what we may call a “problem” can be seen by others as a “solution”.

Starting from this contrast of views, I have chosen to expose the “problem/solution”, taking into account not only scientific, medical, and religious knowledge but also the human vision of a person who does not accept, and perhaps will never be able to accept, this type of mutilation. The method used may clash with other methods or even with other opinions which are always valid, but this thesis is precisely to expose the problem from the point of view of a convinced non-supporter of FGM.

Infibulation or FGM is the most incisive form of sexual, psychological, physical, and social oppression that some societies inflict on women. It has been practiced for thousands of years across different tribes, nations, and followers of different religions. FGM is an explicit, but at the same time a subtle control of the women backed by these societies. According to the World Health Organization 230 million women and children alive today are infibulated and 6000 children are infibulated every day. Those figures are only for Africa where 28 countries out of 54 practice FGM. In the whole world, there are 40 countries perpetrating FGM on all continents, but with much lower percentages. The consequences of FGM are not only physical (the loss of an important part of a woman's body), but sexual (frigidity) and psychological (the sense of being half of a woman). All these problems carry irreversible consequences.

Understanding FGM is of paramount importance because it debunks reality and fades away myths about its connection to religion. With better internet access, global connections with people foreign to this practice, and answers to questions just under everyone's fingertips, the young people of the societies where this mutilation is practiced started to realize that FGM is an extreme violence against women.

Being FGM a taboo, it is not seen as socially acceptable to speak about it. According to society, practicing it is a duty, and talking about it is a shame. This makes any research somewhat faltering. In some areas, like the southern part of Egypt and in Sudan, local chiefs/imams have prohibited men, but especially women from giving interviews or even talking about it to journalists and NGOs. Most data collected before the year 2000 by some international organizations are more accurate than the ones collected recently due to this prohibition. So, numbering FGM has become more difficult over the years and this makes it hard for researchers to present data on politics, economy, health, and human rights (especially women's rights). The long-lasting non-agreement among lawmakers and politicians contributes to making it difficult for researchers to understand the real situation in most countries that practice infibulation. Consequently, the NGOs are becoming unable to explain the reality of the problem to the people (especially to the lower class) who have little or no access to schooling, books, the Internet, or even TV/radio. On the other hand, more and more people from the middle-lower class to the ones from the upper class are slowly gaining access to the Internet and therefore more information is being acquired. This increases the number of anti-FGM followers. Based on these facts, the anti-FGM battle might lose ground where it is more necessary. Hence, the need to study, explain, and inform more about this unacceptable mutilation became even more necessary than it was before. My thesis aims to pass information to all those who may have access to it or are willing to understand the causes, practice, and consequences of

FGM, be it political, religious, economic, and overall, social for the children and women to whom it has been inflicted as well as to those who are willing, due to social pressure and religious belief, to impose it on their children.

In order to collect information about FGM, this study gathered data from different experts in this area. Books, articles, and interviews were taken into consideration to analyze the social outcome of this practice. The aim is to deliver the message that, contrary to what many sustain, FGM is not a religious practice and therefore not related to Islam nor any other religion; it is practiced by different people in different nations; it has a great deal of medical/psychological consequences that cannot be solved and therefore it is against human rights and more specifically against women's rights. It is also clear that FGM is an economic and financial burden to the nations that practice it as well as to the families due to the costs of deinfibulation and re-infibulation (after the birth of every new child) of the wife. These costs extend to the numerous effects caused by this mutilation.

It is of high importance not to provoke a clash between science/human rights on one side and religion/tradition on the other. This could lead to a massive rejection of the two first ones especially because FGM is practiced overwhelmingly by the low and low-middle class, and these two make up the great majority of the population of the nations where FGM is imposed.

This thesis includes twelve chapters and a conclusion. Chapter 4 is a brief explanation of the history of FGM and clarifies that it is not practiced only in Africa, but in all continents with different numberings. Chapter 5 brings up the problematic of the terminology what is very important to distinguish the various types of mutilations and refer to each one of them. Chapter 6 explains the types of mutilations and the definitions used by the World Health organization. Chapter 7 exposes the physical, psychological and social consequences that FGM will bring to the women who undergo and who do not want to follow the procedure. Chapter 8 specifically explains the short-term physical complications that come as consequences of this practice. As for chapter 9, it deepens the study on the lifelong psychological and social problems women and children must face after the operation. Chapter 10 evolves on the judicial area in Muslim and Muslim-majority countries, explains the law and how politicians and religious figures see those laws. It also shows the contrasting opinions on the matter. Chapter 11 shows how the European Union is dealing with the problem FGM among its immigrants. Chapter 12 broadens the research to how the world is dealing with it. This chapter also gives one charter and one map for a better explanation of the problematic. Chapter 13 touches the social part and describes how society sees this tradition/duty and points out the dichotomy pro/cons FGM. Chapter 14 deals with the same problem as chapter 13, but in the Islamic societies with its social and

religious views. Chapter 15 gives a specific view on why FGM is practiced among some cultures: the power and control over the women's body and sexuality. It also brings up the struggle in Egypt to pass a law prohibiting the procedure and the views of some Egyptian Islamic scholars. Chapter 16 is an attempt to shed light on the new thinking (especially from the young ones) about FGM.

2. Types of female genital mutilations and procedures

As late as 1997, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the United Nations Population Fund (UNFPA – from the name United nations Fund for population Activities) declared in a joint statement that there are 4 types of FGM:

Type I — Partial or total removal of the clitoris and/or the prepuce (clitoridectomy).

- When it is important to distinguish between the major variations of Type I mutilation, the following subdivisions are proposed: Type Ia, removal of the clitoral hood or prepuce only; Type Ib, removal of the clitoris hood and the prepuce.

Type II — Partial or total removal of the clitoris and the *labia minora*, with or without excision of the *labia majora*.

- When it is important to distinguish between the major variations that have been documented, the following subdivisions are proposed: Type IIa, removal of the *labia minora* only; Type IIb, partial or total removal of the clitoris and the *labia minora*; Type IIc, partial or total removal of the clitoris, the *labia minora* and the *labia majora*.

Type III — Narrowing of the vaginal orifice with the creation of a covering seal by cutting and positioning the *labia minora* and/or the *labia majora*, with or without excision of the clitoris (infibulation). Type IIIa, removal and apposition of the *labia minora*; Type IIIb, removal and apposition of the *labia majora*.

- Note also that, in French, the term *excision* is often used as a general term covering all types of female genital mutilation.

Type IV — All other harmful procedures to the female genitalia for non-medical purposes, for example: pricking, piercing, incising, scraping, and cauterization.

All these types of FGM are almost always carried out by people who belong to the community/tribe. Generally, it is the older women who carry out the "cut". The mutilation is practiced without the use of anesthesia and with instruments that can be knives, razor blades, glass, scissors, cotton threads (but those are more

expensive), and thorns from various local trees for stitching. Tradition dictates that the little girl must not show signs of pain, must not cry, and must not try to run away. Even after mutilation, girls are not allowed to express pain. All these manifestations could cause “disgrace” to her family. After mutilation, in most cases, little girls have their legs tied so that the wound heals more quickly. To stop the bleeding, FGM “experts” use tea leaves which are mixed in dosages meticulously prepared by them. There are various dosages to achieve different results (to “disinfect”, stop bleeding, heal...). Almost always the girls are attracted by deception by people they know and once inside the room, they will be immobilized by the “helpers”. The tools used for mutilation are washed with water and can be reused to mutilate several girls in a day. The whole procedure is done “from the bottom up”, that is, the lower parts are cut and then the “expert” moves up towards the clitoris. In this form, when the clitoris is cut, it will not be stained with blood, allowing the “expert” to be able to work on a completely visible clitoris. The stitching is also generally done “from bottom to top” for the same reason. Over the years, in some countries such as Egypt, the habit of taking the baby to health workers (midwives and doctors) became normal, but unfortunately, this habit is used, in most cases, only by people from the medium-high and high social strata, and the great majority of the population prefer the “traditional method”.

“In Egypt, for example, preliminary results from the 1995 Demographic and Health Survey indicated that the percentage of women reporting having been “circumcised” by a doctor was 13 percent. In contrast, among the daughters of these more recently “circumcised” women, 46% had been circumcised by a doctor” (Morrone, 2004).

3. Physical, psychological, and social consequences

It would be good to start with some thoughts shared by the women who have undergone FGM and by men who belong to this reality. All these thoughts are reported in the essay written by (Avakian, 2010).

“Here in the office [UN office in Addis Ababa] everyone talks about female genital mutilation as something that is part of culture and therefore unchangeable. Nothing is taken into consideration to protect girls and women from this ferocity.”

“I confess: I am an extremely emotional woman and this pushed me to dedicate myself to humanity with passion and energy in a system that, rejects any form of sensitivity. It is the so-called humanitarian system of some organizations, imprisoned in procedures, in rules, in bureaucracy but, above all, devoured by the greed of some officials who go around in luxurious cars and spend their holidays in Addis Ababa to ‘have a good time’ with beautiful ebony-skin minors.”

"You see, my mother forced me to undergo this practice at the age of 6, only to see me married and with children; instead, I'm still here with the anger and bitterness of having lost part of my body, the flower of my instincts. [...] Many women flee from the villages with their daughters for days, entire weeks, or even entire months to save them from the 'cut'. [...] Believe me, the thing that shocks me the most is that there are cases in which the child herself asks to be subjected to the practice, feeling marginalized compared to her friends, because she is different."

"Let the dogs bark until the caravan passes. Here everything slips away, this is an oral culture. Words color our lives, languages beat and howl both at the moment of birth and during a funeral. We should remind our people that infibulation is not a religious fact as it was also widespread in other pre-Islamic cultures. My wonderful people do not want to admit that 'cutting' is terribly harmful, since it affects a person, influencing their physical, emotional, and psychological growth. [...] You see, we men, in this region, conceive sexuality as a weapon, so we feel the power to hold the lives of our wives in our hands." (Interview with a father who did not want to subject his daughters to infibulation)

These thoughts make us understand that the problem of FGM goes beyond the lack of the law itself. The debate on this practice also takes place within organisms, passes through the chauvinistic culture, and reaches the victim who is only the last link in this horrible chain of mutilation. It is important to know that the psychological aspects of FGM are not less (and perhaps even greater) than the somatic, physical, and physiological aspects that the girl/woman suffers during and after the mutilation. Furthermore, physical pain and/or lack of sensation is not limited to the vulva area, but can also affect other parts of the body such as the breasts. Frigidity is one of the most recurring problems in mutilated and married women. The woman becomes not a partner in pleasure, but only a means by which the husband achieves his sexual pleasure. Every sexual relationship with her husband becomes a suffering. Pregnancy and childbirth become a real torture repeated over time. The woman is present with the mutilated body, but she does not take part in the pleasure because it is considered not honorable for a woman to feel pleasure with her husband. In truth, girls are subjected to infibulation precisely because they must not "fall into the risk" of experiencing sexual pleasure and consequently dishonoring the family. The combination of all these sufferings leads women to such a loss of self-esteem that in most cases the process cannot be reversed. On 19 November 1999, the Italian newspaper *La Repubblica* published the following text which indicates the "need to be cut":

“At the moment of the ‘ceremony’, the girls must not cry. It would be a negative test; it would make their parents ashamed. ‘If you cry you are not worthy of your father’, sings [a typical song used to distract from the pain and to encourage the little girls] the women of the village. Upon leaving, the little ones find tam-tams welcoming them: it’s a party. ‘If you are not excised you have no friends, you have no right to be courted by any boy, you cannot behave like a woman’. Usually, it takes seven days to heal the wound, if the wound is not healed, they must go to a hospital. Some of them will die in a small dark room [in a hospital], far from home, often far from their parents, after being cut with a rusty knife without any anesthesia.”

Nowadays, even some men are starting to oppose FGM as it is clear in the interview given by Ali Ibrahim to the Kenyan magazine *Reject*:

“I couldn’t penetrate her. I tried in vain for a week and my wife kept crying because of the pain,” says Ali Ibrahim. He adds: “I asked myself the importance of marriage if one had to suffer so much. I nearly called it over.” This was Ibrahim’s wedding night. He was unable to consummate his marriage. The following morning, he complained to his family about the problem and was told to be patient as most men undergo the same ordeal. He was informed it was not the groom’s mistake but a problem brought about by the cultural tradition of female genital mutilation. “I was told that even my father and forefathers encountered the same problem during their wedding night,” recalls Ibrahim. “I was asked to be patient while the problem was being sorted out. My wife was then taken to hospital for surgical deinfibulation.” he added ” (Avakian, 2010, p. 12).

“Ali Ibrahim’s wife was lucky because in almost all cases the groom or the bride’s relatives widen the vaginal opening using a small unsterilized, therefore potentially infected, knife or razor blade to allow sexual intercourse. A few weeks after the wedding, female members of the groom’s family examine the bride, and if necessary, further widen the vaginal opening to facilitate intercourse. The enlargement functional to the consummation of marriage does not, however, allow childbirth. In this case, the woman must be deinfibulated. This task must be carried out by the *mammana* [traditional midwife in some countries in Africa] or by the women of the family. After childbirth, infibulation must be restored.” (Avakian, 2010, p. 12).

The child/woman (the victim), the husband (usufructuary), the mother (the ones who impose), the midwife (the mutilator), and the women of the groom and bride's family (the controllers) all take part in the process of infibulation. It cannot be left out all the other people who do not have a direct role in infibulation, but who support this practice or who condemn the child/woman if she does not submit to this mutilation. The decision to mutilate a female child can be taken by any female family member even if the mother and the father are contrary to it. While it is known the direct and indirect physical and psychological complications that such mutilation leaves in women, one cannot say how many women suffer or have suffered from FGM. Aldo Morrone (in *Bodies and Symbols – Immigration, sexuality, and FGM in Europe*) asserts that “So far few studies have been conducted on this topic. Only 15-20% of complications come to the attention of medical personnel due to the unavailability or difficulty of healthcare, ignorance, or fear of the law or society. Most health professionals deal with complications, but sometimes with disastrous consequences. Only the most serious consequences are reported to healthcare personnel (Morrone, 2004, p. 38).

4. Immediate and short-term physical complications

Legal, Cultural and Medical Issues that among others, those seven problems are the most common short-term physical complications for the women who have undergone FGM (Skaine, 2005, p.102).

a) Death: To this date, there are no relevant studies on the percentage of deaths due to FGM. The patient can die due to bleeding, unbearable pain, or more frequently due to infection caused by objects that are not sterilized. Due to the taboo, it is very hard for the NGOs or even the government to release the percentage of children who died during or right after the mutilation.

b) Acute pain: Since most female genital mutilations are performed without anesthesia, girls undergo extremely acute pain. The cut, not being made with precision instruments, can also affect other parts of the urogenital system (and adjacent areas) of the child such as the perineum, urethra, inner part of the vagina, and anus. These cuts may also cause irreparable damage to these organs.

c) Hemorrhage: To achieve total excision of the clitoris it is necessary to cut the clitoral artery and, due to the strong blood flow that passes through this artery, the risk of hemorrhage is very high. Traditional remedies such as tea leaves and/or ash are applied to stop the bleeding. In fact, many girls die, following the heavy bleeding caused by the cut.

d) Tetanus is another factor that must be taken into consideration since traditional midwives use non-sterilized and sometimes even rusty objects to practice the mutilation. In some countries in Africa, the average of children who have been vaccinated against tetanus is below 50.

e) Another problem is that in the first days after the mutilation urinary retention may occur. This retention is caused by the strong inflammation caused by the wound and by the child's fear of feeling pain when urinating. When the urethra suffers collateral damage, it causes severe pain, especially during the passage of urine.

f) It has been reported that the fracture of the clavicle, femur, or humerus or even the displacement of the femoral joints can occur while adults try to hold the child still to ensure that the "cut" is "perfect" and "do not cause harm".

g) Another important factor that often leads to serious consequences like the non-healing of the wound is the fact that girls are often malnourished or have anemia. To ensure that a wound caused by such severe mutilation on girls heals well and quickly, the girl subjected to such mutilation must be in the best health conditions, which rarely happens.

As for the permanent physical complications, Skaine (2005) cites:

a) One of the permanent complications is the chronic infection of the urogenital system (Not all girls/women who undergo FGM suffer from this infection and there is not enough data on the percentage). This infection manifests itself already in the kidneys (few cases), passing through the ureter, bladder, and urethra as regards the urinary system and manifests itself in the uterus, vaginal fornix, pubis, G-spot, clitoris and the cavity of the vagina. In some girls/women, cutting can cause various complications, including in the sphincter and rectum.

b) Pelvic infection can also be one of the consequences of FGM and can lead to sterility in women. Typically, this type of infection occurs when the woman has undergone type III infibulation.

c) Fistulas are also common in girls/women who have undergone FGM. They can be of the vesico-vaginal or recto-vaginal type. Furthermore, the habit of defibulating to facilitate nuptial intercourse and re-infibulation can cause (or increase) the manifestation of fistulas. Sexual intercourse and even childbirth can cause (or increase) the continuous appearance of fistulas in women (and even in girls).

d) The abscess can be caused by a deep infection due to incomplete healing. In this case, to treat the abscess you must intervene with a surgical cut.

Other no less important anomalies or consequences are reported by Morrone (2004):

- a) Keloid: The slow and incomplete wound healing and post-operative infection can result in the production of excess connective tissue on the scar.

- b) Vulvar cysts and abscesses: Inclusion dermoid cysts are the most common complications of infibulation. A clitoral neuroma can develop as a result of entrapment of the clitoral nerve in a stitch or in the scar tissue of the healed wound, resulting in hypersensitivity and dyspareunia. It is a very painful consequence. Menstrual difficulties can occur as a consequence of partial or total occlusion of the vaginal orifice. The formation of stones in the vagina can be the result of the accumulation of menstrual debris and urinary deposits in the vagina or in the space behind the bridge of healing tissue formed after infibulation.
- c) The development of a “false vagina”: This may happen in women undergoing infibulation if, during repeated sexual intercourse, the healing tissue does not dilate sufficiently to allow normal penetration.
- d) Dyspareunia: It is a consequence of many forms of female genital mutilation due to scarring, reduced vaginal opening, and complications such as infections.
- e) Sexual dysfunction: It can occur in both partners due to painful sexual intercourse, difficulty with penetration, and reduced sexual sensitivity following clitoridectomy.
- f) Difficulty in providing gynecological care: Scarring following type III mutilation may reduce the vaginal opening to the point that an adequate gynecological examination cannot be performed without making an incision.
- g) Problems during pregnancy and childbirth are widespread, particularly if a type III mutilation has been performed because the hard scar tissue causes partial or total occlusion of the vaginal opening and hinders the dilation of the birth canal.

In addition, other sexually sensitive parts of the body (such as the breasts, buttocks, lips, neck, and ears) may become much more sensitive to compensate for the loss of potential clitoral stimulation. Since infibulation leaves the woman with no sexually sensitive genital tissue, other sensitive areas must contribute more to compensate. Although FGM does not affect the hormonal stimuli that cause sexual arousal and desire, it is clear that it has a very negative effect on a woman's ability to experience sexual pleasure (Tola & Scassellati, 2001).

5. Lifetime Psychological and social problems

These two factors are almost always connected because while the woman must take into account the social problems that require mutilation, this same mutilation causes insurmountable psychological consequences due to the loss of an important and sensitive part of her body. The little girls find themselves in the difficult choice of being accepted by society by giving up their self or maintaining their ego to the detriment of society. This paradox does not disappear with mutilation, but once subjected to this practice she can never go back. Once FGM has been performed, the woman is accepted by society, but she no longer accepts herself. There are rare cases in which this problem can be solved. While one can state with more certainty what the medical (physical) problems are related to FGM, for psychological problems one does not have sufficiently reliable medical literature to draw acceptable conclusions on a psychological level. Among the most common sexual problems we find:

- a) Frigidity due not only to the fear of pain during the sexual act (dyspareunia) but also due to continuous infections caused by cutting and/or closure;
- b) Inability to reach orgasm due to clitoridectomy and the fact that women are targets of social ("religious" or traditional) messages that lead them to believe that pleasure during the sexual act is a sin or a source of shame;
- c) Coital difficulty (or impossibility) due to narrowing of the vaginal canal (stenosis);
- d) Difficulties within the couple's relationship.

Not less important are the psychological problems that girls/women have to face after undergoing mutilation, but also if they refuse to undergo it. In the first case, as mentioned before, self-esteem is lost because they know they have lost an important part of their body which is precisely the part that distinguishes them as a woman; as the years go by, they feel like half women or physically "half alive" people, with no importance to society. The constant fear of physical pain turns into psychological fear, preventing them, not only physically, but also psychologically from deriving any pleasure from sexual life with their husband. For those who "managed" to escape mutilation, the social problem is truly more incisive and this causes other significant psychological problems (exclusion from society).

A non-mutilated woman will have less chance (or no chance) of finding a husband, her friends will exclude her from the group, her family will be

dishonored, and her sisters and brothers will have great difficulty finding marriage themselves. She will be called “open” and therefore she is worthless. All this will cause such a strong sense of diversity in the little girls that some of them prefer to "voluntarily" undergo genital mutilation to feel part of society. This psycho-social blackmail causes the little girl to live in a state of anxiety/humiliation before the mutilation and repentance/humiliation after the mutilation. Without the mutilation, she has no social value and after the mutilation, she has no value as an individual. Girls/women who have undergone any type of FGM will carry the burden of psychological consequences throughout their lives even if they will have to hide the "discomfort" so as not to cause dishonor to their husbands and their/her families. They will have to suffer their fate without showing their displeasure (Lepera & Da Molin, 2010).

Most physical pains and problems caused by FGM are identified by doctors, but very little is known about the psychological pain and trauma these children (and then women) must face. These problems are linked not only to the cut itself but also to the way they see themselves and the way society sees them. On the other hand, if they do not accept the mutilation, society will create social and consequently psychological problems for them. In the areas where this practice is done, very few children are able to escape or refuse the mutilation. Another physical and psychological problem is the re-infibulation after every childbirth or if the husband leaves for a long period of time. It is to say that FGM reduces the possibility of reaching an orgasm for the woman. The continuous “open and close” will certainly eliminate the possibility. The FGM completely “deletes” her sexual organ, and leaves only the reproductive organs to ensure the offspring.

6. Conclusion

The final analysis has different implications for understanding FGM. First and foremost, it involves children, mothers, fathers, practitioners, community members (male and female) who directly (family) or indirectly (friends) weigh the economic and social costs and benefits associated in taking part in this practice.

FGM has been practiced even before the pharaonic period, way before the foundations of all local religions, but different traditions lead many societies to believe that directly or indirectly FGM is connected to religion. It most probably started in Egypt and spread its practice over a vast area along the time. Nowadays, with the event of Internet more and more people are coming to know the consequences, especially medical ones, of this practice and with the help of local and international NGOs the younger generations are keen to confront society and its traditions. The result is that today, some women are not willing to practice on their daughters the procedure. Even some young men are preferring to marry girls

who have not been infibulated. Those may be seen as few steps, but they are certainly important and the first of a series.

It is known that there are many types of body modifications (mutilations) that can be temporary, permanent, superficial or deep, genital or non-genital in all societies and these are spread in different places geographically distant (not only in Africa but in every continent). In order to keep on informing the society about the consequences of FGM, people foreign to societies that practice it should be cautious and not try to force Western views on the locals because this may cause a clash between “they” and “us”. The approach should be informative instead of judgmental. Non practicing societies should not see the practicing societies as “savage” or “backward”, but should try to convince and explain the effects of FGM. It is also paramount to have in mind that social “problems” may have different answers in different places, so one solution most probably will not be suitable for all societies. In the case of Africa, there are different Nations and inside them there are different ethnicities with different tribes and every one of them requires a patient and steady approach made specifically for each one of them.

The control of women’s sexuality in Africa is part of society though it is slowly changing, therefore, we, foreign to this process must use the best tools in order to slowly change their views on women, FGM, empowerment, and human rights. This process may take years or even generations. A “immediately now” process may destroy what has been conquered. It is already known that laws, although necessary, do little to combat FGM. It is much more significant to persuade youngsters using the school system and what the young likes the most: the Internet.

Secondly, it is advisable to take sides with the ones who are anti-FGM (local religious leaders, women and children’s rights associations) and try to flow with them because they know the culture and traditions, actually they are part of the culture. This method is being used in Kenya and it works. It is just a matter of patience and time.

Thirdly, Western countries should help with medical and technical issues. They should give assistance to the girls and women in order not only to mitigate their physical and psychological sufferings, but also to help the women to be financially, therefore more independent from their fathers and husbands. Financial empowerment is one of the key points for the solution of the FGM problem.

7. International Organizations and associations against Female Genital Mutilation

All names and addresses in this list were taken from Bodies and Symbols – Immigration, Sexuality and Female Genital Mutilation in Europe) edited by Aldo Morrone and Pietro Vilpiani (Armando Editore - 2004).

AMANITARE (African Partnership for Sexual and Reproductive Health and Rights of Women and Girls) – www.amanitare.org

AllAfrica.com – www.alafrica.com

Amnesty International Organisation
www.amnestyinternational.org/ailib/intcam/femgen/fgm.htm

Association Centre La Mutilation Des Enfants – www.enfant.org

Center for Development and Population Activities (CEDPA) – www.cedpa.org

Circumcision Information Resource (CIRP) – www.cirp.org

Circumcision Resource Center (CRC) – www.circumcision.org

Family Health International (FHI) Publications – www.fhi.org/gen/nbooksrep.html

Female Genital Mutilation Network and Message Board – www.fmg.org

FGM Education and Networking, Albany, CA. USA – www.fmg.network.org

Forward UK – www.forward.dircon.co.uk

Global Reproductive Health Forum: Gender – www.hsph.harvard.edu/Organizations/heatlnet/reprorights/topic12.html

Human Rights Internet (HRI) – www.hri.ca

International Centre for Reproductive Health: Database on FGM Resources in Europe – www.icrh.org/areas/fgm/db_persons.htm

International Planet Parenthood Federation (IPPF) – www.ippf.org/fgm/index.htm

National Organization for Circumcision Information Resource Centers (NOCIRC) – www.nocirc.org

PATH – www.path.org

POPLINE - www.db.jhuccp.org/popinform/index.stm

RAINBO (Research Action, and Information Network for the Bodily Integrity of Women) – www.raibo.org

Stop FGM – www.stopfgm.org

The Alan Guttmacher Institute (AGI) – www.agi.usa.org/

The Female Genital Mutilation Education and Networking Project –
www.fgmnetwork.org

The Inter-African Committee on Traditional Practices Affecting the Health of
Women and Children (IAC) – www.iac-ciaf.ch

The Population Council – www.popcouncil.org/

TOSTAN – www.tostan.org

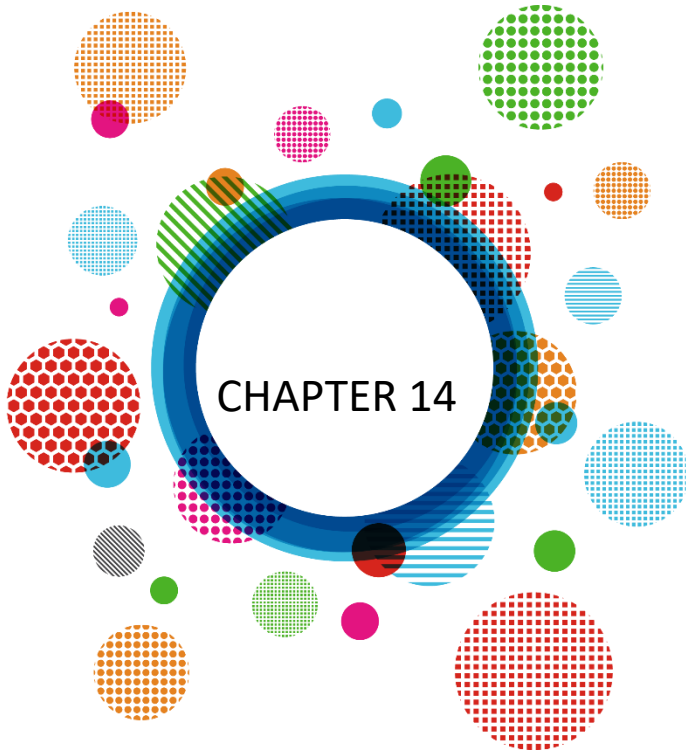
United Nations High Commissioner for Human Rights (UNHCR) –
www.unhcr.ch

Women's International Network (WIN) News – feminist.com/win.htm

World Health Organization (WHO) – www.who.int/frh-whd/FGM/index.htm

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A Phonological and Semantic Analysis of English Words Used in Turkish And Russian

Mariana Budu¹

¹ Dr. Öğr. Üyesi, Istanbul University Istanbul, Turkey
ORCID:0000-0001-9000-4029

1. Introduction

Languages influence each other over time due to economic, political, and sociocultural factors. This interaction includes borrowing, substratum influence, and superstratum influence. Borrowing happens when one language adopts features from another. Substratum influence occurs when a previously dominant language impacts a subsequent one, while superstratum influence describes the impact of a dominant language on a subordinate one. Bilingualism and multilingualism also contribute to language contact and change (Doğan, 2007, p. 121).

The historical impact of the English language on both Russian and Turkish can be summarized as follows:

The Turkish language has historically drawn vocabulary from many languages. Arabic and Persian were influential from about the 10th century to the dawn of the early modern period. Their impact declined as the Ottoman Empire shifted towards Western civilization, leading to greater influence of Western languages on Turkish (Özkan, 2022, p. 85-90). Intense relations with Western languages began with Italian, and subsequently expanded to include Greek and Spanish, later also French, German, and English. The first notable political relationship between Turkey and England was the appointment of William Harborne as the English Ambassador to the Sublime Porte in 1583. After this, the relationship between Turkish and English took off in the 16th century when English merchants began trading in Ottoman lands. But linguistic interactions intensified particularly after World War II, the global influence of American culture fostered growing ties between Turkish and English, a relationship that continues to shape the Turkish language to this day (Ercilasun, 2013, p.10-11).

Starting in the 1950s, the Turkish economy became increasingly involved in international activities. This led to the widespread use of certain foreign currencies within Turkey. As a result, a large number of economic terms, especially from English, entered the Turkish language.

Following Turkey's accession to NATO in 1952, bilateral relations between the two countries, primarily in the political, economic, and cultural spheres, extended into the realms of science and technology. The advent of the internet has facilitated the rapid adoption of numerous IT terms from English into Turkish (Turan, 2010, p. 3).

The beginning of the penetration of English words into the Russian language is considered to have occurred in the middle or the end of the 16th century, when a direct rapprochement between Russia and England began. Since the beginning of trade relations, Russia and England have established fairly strong political and diplomatic ties. After Peter I ascended the throne, great importance began to be

attached to the study of the English language. Russians began to travel more frequently to England to study not only English, but also other sciences – shipbuilding, military and engineering (Benson, 1959, p. 248-249).

In the 18th century, during the reign of Catherine the Great, a translation society was established, which specialized in translations from English. These were mainly books about agriculture, English law, religion, history, English life, fashion, etc. The international prestige of England increased by the end of the 18th – beginning of the 19th century. Rapid industrial development began in England. This contributed to the flourishing of science and technology in England and the growth of its influence on other countries of Europe and Russia. Famous Russian writers, poets, and critics knew and loved English: A. S. Pushkin, V. A. Zhukovsky, M. Yu. Lermontov, A. S. Griboyedov, I. S. Turgenev, L. N. Tolstoy, A. A. Fet and many others (Ginza and Gorbunova, 2017, p. 305-306). By the mid-1830s, about 30 novels by W. Scott and 6 novels by F. Cooper were been translated into Russian. Russians first became acquainted with many English literary works through the theatre. Such a wide dissemination of English literature in Russia could not but affect the lexical composition of the Russian literary language.

While the infiltration of English borrowings into the Russian language commenced in the late 18th and early 19th century, their substantial integration into the Russian lexicon remained limited until the 1990s. This period witnessed a surge in lexical borrowing, encompassing both neologisms representing novel concepts absent in the Russian cognitive framework (e.g., computer terminology and business lexicon), and the supplanting of existing Russian lexical items with English counterparts to convey nuanced connotations, both positive and negative, not inherent in the original Russian terms.

The Perestroika era (1985–1991) ushered in a period of significant linguistic change. The effects of political and economic reforms were evident not only in the expansion of the vocabulary but also in a noticeable liberalization of overall language use. These changes are reflected in shifts in linguistic preferences and a relaxation of established norms (Szabolcs, 2010, p. 45-46).

As can be seen, the influence of English on Russian and Turkish began gradually in the 16th century. But its real influence on Turkish began in the 1950s and on Russian in the 1990s. When then did the influence of Russian on Turkish and Turkish on Russian begin? To answer this question, it is necessary to focus on the interaction between these two languages. Russian and Turkish are two languages that have maintained their interaction from the past to the present. There is no definite date for the relationship between the two languages. However, based on sources, we have been able to identify the following historical periods (Budu, 2016, p. 19).

The first period: Before Kievan Russia (1–8th century):

In this period, Turkic words such as *алтын* < *altın* “gold”; *товар* < *davar* (OT 1. Mounted animal. 2. Four-legged farm animal. 3. Property.); *каган* < *kagan* (the head of state to which the Khans are subject); *ковёр* < *kiviz* (carpet, rug) were adopted into East Slavic languages.

The second period: the Kievan Russia (9–12th century):

In this period, Turkic words such as *басурман* < *Müsülman* (Muslim); *баушмак* < *basmak* (footwear); *камыш* < *kamış* (reed); *богатырь* < *bahadır* (a person who gains superiority or demonstrates valor in battles through their strength and indomitable spirit.) were adopted into East Slavic languages.

The third period, the period after the Mongol invasion (13–15th century). In this period, Turkic words such as *деньги* < *tamga* (money); *караул* < *karavul* (spotter, guard, guardhouse); *хаджи* < *hacı* (a Muslim who has gone on a pilgrimage to fulfill religious commands) were adopted into Slavic languages.

The fourth period: The period of Russian principalities (16–19th century). In this period, Turkish words such as *башибузук* < *başıbozuk* (confused, inextricable); *кинжал* < *hancer* (a type of knife with a curved and pointed tip, resembling a dagger, used as a weapon) were adopted into Russian.

The fifth period, the period after the fall of the USSR (20th century). In this period, words such as *дьюшман* < *düşman* (enemy) were adopted into Russian.

Turkic-Slavic relations date back to the early medieval period. However, documented studies have only identified approximately 39 words of Russian origin in standard Turkish. This number reaches close to 100 when regional dialects of Turkish are taken into account. Furthermore, including other Turkic languages significantly increases this figure, exceeding 1000. Conversely, approximately 2500 words have passed from Turkish and other Turkic languages to Russian. Further research is needed to comprehensively analyze this linguistic exchange. We can list the following loanwords from Russian that passed into Turkish: *капустка* > *kapuska* (cabbage); *колхоз* > *kolhoz* (collective farm); *матрёшка* > *matruşka* (matryoshka doll); *тройка* > *troika* (troika); *бояр* > *boyar* (boyar); *ватка* > *vatka* (piece of absorbent cotton); *мазот* > *mazot* (diesel fuel); *шанка* > *şapka* (hat) (Daşdemir ve Efendioğlu, 2016, p. 54-55).

Several factors contribute to the influx of English loanwords into the Russian and Turkish languages:

a) Media influence: The media, particularly printed and electronic media, play a crucial role in disseminating English borrowings. The rapid dissemination of

news from foreign sources often necessitates the use of foreign terms, especially when direct equivalents in Russian and Turkish are lacking.

Thanks to the media, the vocabulary has been replenished with such words as *prime-time* > (Tksh.) *prime time*, (Russ.) *прайм-тайм*; *talk-show* > (Tksh.) *tolgshow* (It is Tolga Çevik's show), (Russ.) *ток-шоу*; *marketing* > (Tksh.) *marketing*, (Russ.) *маркетинг*; *leasing* > (Tksh.) *leasing*, (Russ.) *лизинг*; *broker* > (Tksh.) *broker*; (Russ.) *брокер*; *speaker* > (Tksh.) *spiker*, (Russ.) *спикер* etc. (Varabyeva, 2003, p. 117-121).

b) Impact of advertising: The emergence of the advertising industry in Russia and Turkey, heavily influenced by Western, particularly English-language, models, has introduced numerous English terms into the Russian and Turkish languages. These borrowings not only serve a terminological function but also carry a sense of prestige and novelty.

The use of English loanwords in advertisements is a very common phenomenon. For example, in Turkish and Russian, advertisements often contain English linguistic units. Names of shops and organizations in Russian often contain English loanwords in their “pure” form, written in the Latin alphabet (Boyko, 2012, p. 133-134): “World Spa”, “Beauty Salon”, accessories store “Simple Beauty”, “Brand House”, children’s goods store “Anny Baby”, “Coffeeshop company” and “Traveler’s coffee”, clothing store “Respect yourself” etc. In Turkish, the usage of some place names such as “Ali’s Apart Otel”, “Mel’s Restaurant”, “Özdemir’s Çorap” can be given as examples. It is also necessary to mention the names of workplaces we see in various cities, towns and even smaller settlements around Istanbul and Anatolia: Angela Müzik Evi (Angela’s Music House), Diana Spor Malzemesi (Diana’s Sports Equipment), Flower Çiçekçisi (Flower Florist), Matrix Internet Café (Matrix İnternet Café), Moonlight Okey Salonu (Moonlight Okey Hall), Pretty Bayan Kuaför (Pretty Women’s Hairdresser), Simitland (Simit Center), Simit House (Simit House), Shopping Center (Shopping Center), Show-Room (Show-Room), Olympic Spor Merkez (Olympic Sports Center), Outlet Center (Outlet Center) etc.

English words that entered Turkish and Russian with advertising, such as “Coca-Cola” and similar product advertisements, and the word “light”, which entered Turkish, is used for many diet products. Such as “Ülker Mavi-Yeşil light biscuits”, “Uludağ light soda”, “light bread”, “Pınar Süt light” etc.

One of the interesting examples is the word “baby”, this foreign word is preferred in baby care products and is used in such ways as *baby shampoo* > (Tksh.) *baby şampuan*; (Russ.) *baby шампунь* etc.

The words "baby" and "kids" are often used in Russian baby shampoo brands: "Happy Kids Детский Шампунь", "Aura Baby Детский Шампунь", "Little Love Kids Шампунь" etc.

Also "sunroof", "sky window", "xenon", "cruise control", "spoiler", "sensor" that provide information about cars. There are also "stretch and curl mascaras that create hypnotic eyes", "magic touch systems" that start working while the user is still thinking, "freshmaker candies", "integral toothpastes", "coenzyme Q-10 creams". Shampoos emphasize their importance with foreign words such as "nutravive" or "vital", "amino acid". These words do not always indicate the real qualities of the product. For example, for laundry detergents, words such as "automat", "vitactif" etc. are used, but when "vitactif" detergent is introduced, it is said that "it affects the laundry as if it were a vitamin", thus it is understood that the product does not contain vitamins and that an analogy is being used.

Therefore, it can be concluded that Turkish, English, and Russian form a linguistic triangle through the influence of English advertisements. English loanwords in Turkish and Russian serve not only a terminological purpose but also convey cultural values, prestige, and a sense of innovation in language and social life. The prevalence of English loanwords is evident in both Turkish and Russian. These English loanwords, especially in advertising, are often not translated or adapted according to Russian and Turkish morphological and phonological rules.

c) Youth culture: Youth culture, particularly through exposure to satellite television, the internet, and global music trends, significantly contributes to the adoption of English borrowings in Russian and Turkish slang.

It includes, among many others, the following words which are used by Russian and Turkish youth in everyday communication and in standard everyday situations: *boy-friend* > (Tksh.) *boyfriend*, (Russ.) *бойфренд*; *weekend* > (Tksh.) *vikend*, (Russ.) *викэнд*; *party* > (Tksh.) *parti*, (Russ.) *пати*; *baby* > (Tksh.) *baby*, (Russ.) *бейбу*; *go* > (Tksh.) *go go*, (Russ.) *гой* etc. In Russian some of these slang units are no longer considered slang at all, since they have firmly entered our lives and, as a result, our vocabulary, that is, a friend or a young man is called a boyfriend, a person who is unlucky — a loser, etc.

2. The phonological and semantic modification of English loanwords in Russian and Turkish.

2.1. Vowels

In over 80% of instances (Szabolcs, 2010, p. 51), English long /i:/ sound corresponds to Russian short /i/ «и». However, there appears to be no equivalent

change in Turkish. If the sound /i:/ is indicated by the letter <e> Russian /i/ is often replaced by /e/:

dealer > (Tksh.) *dealer*, (Russ.) *дилер*

dealer (BrE ['di:lə], AmE ['di:lər]): '1. a person who buys and sells articles without altering their condition; trader or merchant, esp[ecially] a wholesaler 2. cards the player distributing the cards. 3. a person who behaves or acts toward another or others in a specified manner. 4. slang a person who buys and sells drugs illegally. 5. a person who buys securities for his or her account and retains them until sold to another' (Webster, 1996). Both Turkish and Russian have borrowed the English word 'dealer', using it in the same fifth sense as it is used in English.

leasing > (Tksh.) *leasing*, (Russ.) *лизинг*

leasing (BrE and AmE ['li:sɪŋ]): '1. Archaic lying; falsehood (Webster, 1996), 2. 'the act of using or letting somebody use something, especially property or equipment, in exchange for rent or a regular payment. In Russian and Turkish, the word "leasing" is used in its second meaning.

steam > (Tksh.) *istim*, (Russ.) *стим*

steam (BrE and AmE [sti:m]): 'n. 1. water in the form of an invisible gas or vapor. 2. water changed to this form by boiling, extensively used for the generation of mechanical power, for heating proposes, etc. 3. the mist formed when the gas or vapor from boiling water condenses in the air. 4. an exhalation of a vapor or mist. 5. Informal power or energy. *adj.* 6. heated by or heating with steam. 7. propelled by or propelling with a steam engine. 8. operated by steam. 9. conducting steam. 10. bathed with or affected by steam. 11. of or pertaining to steam' (Webster, 1996). The English word 'steam' has been adopted into Turkish and Russian, taking on different meanings in each language. In Turkish, it has acquired the first and second meanings of the English word, while Russian has adopted the fifth meaning. While 'steam' can function as both a noun and an adjective in English, it is primarily used as a noun in Turkish. The Turkish meaning of 'steam' has expanded to include the concept of 'alcoholic drink' and 'state of intoxication', which is not found in English. This semantic extension resulted in a colloquial and slang usage. The word's phonological structure has also changed in Turkish. In Turkish, since no two consonants appear together in the first syllable, the word "steam" adds an /i/ sound. Furthermore, the long vowel sound in English has been shortened in Turkish.

decoder > (Tksh.) *decoder*, (Russ.) *декодер*

decoder (BrE [ˌdi:'kəʊdər], AmE [ˌdi:'kəʊdər]): '1. a person who decodes messages or the like. 2. a device for decoding cryptograms, codes, or the like, as

an electric or electronic apparatus that transforms arbitrary input signals into letters, words, etc. 3. Navig. an electronic circuit designed to respond only to certain signals and to reject others. 4. Computers a circuit designed to produce a single output when actuated by a certain combination of inputs. 5. Television a box attached to a television set containing circuitry to unscramble encoded signals, as cable-television programs or closed captions, so that the signals can be displayed on the screen' (Webster, 1996). While both Turkish and Russian have borrowed the English word 'decoder', Turkish has adopted both the second and fifth meanings, whereas Russian has only adopted the second.

2.1.2. English /ɜ:/ appears as /œ/ <ö> or /i/ <i> in Turkish and /i/ <и> or /ə/ <ë> in Russian:

sir > (Tksh.) *sör*, (Russ.) *cup/ cəp*

sir (BrE [sɜːr], AmR [sɜːr]): '1. a respectful or formal term of address used to a man. 2. (*cap.*) the distinctive title of a knight or baronet. 3. (*cap.*) a title of respect for some notable personage of ancient times. 4. a lord or gentleman. 5. an ironic or humorous title of respect. 6. Archaic a title of respect used before a noun to designate profession, rank, etc.' (Webster, 1996). The Turkish language has borrowed the English word 'sir', adopting its second and fourth meanings. In Russian, it has the meaning of 'a title in England and France, the same as Sir'.

first-class > (Tksh.) *first-class*, (Russ.) *фёрст-класс*

first-class (BrE [fɜːst klaːs], AmE [fɜːrst klæs]): '1. the best, finest, or highest class, grade or rank. 2. the most expensive and most luxurious class of accommodation on trains, ships, airplanes, etc. 3. in the U.S. Postal Service the class of mail consisting of letters, postal cards, or the like, together with all mailable matter sealed against inspection. 4. Brit. Univ. the group receiving the highest distinction in an honors course. *adj.* 5. of the highest or best class or quality. 6. best-equipped and most expensive. 7. given or entitled to preferred treatment, handling, etc.' (Webster, 1996). The word "first class" has passed into Turkish with its 1st and 5th meanings in English. It has passed into Russian only with its 1st meaning.

2.1.3. English /u:/ corresponds to Turkish /u/ <ö> and Russian /u/ <y>:

foot > (Tksh.) *fut*, (Russ.) *фум*

foot (BrE and AmE [fʊt]): '1. (in vertebrates) the terminal part of the leg, below the ankle joint, on which the body stands and moves. 2. (in invertebrates) any part similar in position or function. 3. such a part considered as the organ of locomotion. 4. a unit of length, originally derived from the length of the human foot. It is divided into 12 inches and equal to 30.48 centimeters. 5. foot soldiers; infantry. 6. walking or running motion; pace. 7. quality or character of movement

or motion; tread; step. 8. any part or thing resembling a foot, as in function, placement, shape, etc. 9. Furniture a). a shaped or ornamented feature terminating a leg at its lower part. b). any of several short legs supporting a central shaft, as of a pedestal table. 10. a rim, flange, or flaring part, often distinctively treated, serving as a base for a table furnishing or utensil, as a glass, teapot, or candlestick. 11. the part of a stocking, sock, etc., covering the foot. 12. the lowest part, or bottom, of anything, as of a hill, ladder, page, etc. 13. a supporting part; base. 14. the part of anything opposite the top or head. 15. the end of a bed, grave, etc., toward which the feet are placed. 16. Print. the part of the type body that forms the sides of the groove, at the base. 17. the last, as of a series. 18. that which is written at the bottom, as the total of an account. 19. Pros. a group of syllables constituting a metrical unit of a verse. 20. Usually, foots. a. sediment or dregs. b. footlights. 21. Naut. the lower edge of a sail' (Webster, 1996). The English word 'foot' has been borrowed into Turkish with its third meaning in English, and into Russian with both its third and fourth meanings.

igloo > (Tksh.) *iglu*, (Russ.) *узел*

igloo (BrE and AmE ['ɪɡlu:]): '1. an Eskimo house, being a dome-shaped hut usually built of blocks of hard snow. 2. Informal any dome-shaped construction thought to resemble an igloo. 3. Mil. a dome-shaped building for the storage of rockets or other munitions. 4. an excavation made by a seal in the snow over its breathing hole in the ice (Webster, 1996). The English word 'igloo' has been adopted into Turkish with its first meaning in English, and into Russian with both its first and third meanings.

shoot > (Tksh.) *şut*, (Russ.) *уым*

shoot (BrE and AmE [ʃu:t]): '1. Sports (sp.) v.t. a. to throw, kick, or otherwise propel (a ball, puck, etc.), as at a goal or teammate. b. to score (a goal, points, etc.) by propelling the ball, puck, etc. 2. Sports, Games a. to propel a ball, puck, etc., at a goal, basket, pocket, etc., or in a specific direction. b. to propel a ball in a specific way' (Webster, 1996). The English noun 'shoot' has semantic distinctions from its verb forms. The Turkish meaning 'a forceful kick in football' corresponds semantically to the verb forms of 'shoot' in English. Thus, it is plausible that the word was initially borrowed as the verb 'to shoot' (or 'to kick') and later nominalized as 'şut'. In Russian, 'shoot' is employed to denote any infringement of kayfabe in wrestling, encompassing both physical and scripted violations.

zoom > (Tksh.) *zum*, (Russ.) *зум*

zoom (BrE and AmE [zu:m]): '1. the act or process of zooming. 2. a zooming sound. 3. Informal zoom lens: (in a camera or motion-picture projector) a lens assembly whose focal length can be continuously adjusted to provide various

degrees of magnification without any loss of focus, thus combining the features of wide-angle, normal, and telephoto lenses. 4. Also called zoom shot. Motion Pictures, Television a shot in which a subject, scene, or action is brought closer or made to recede by the use of a zoom lens)' (Webster, 1996). The English word 'zoom' has been adopted into both Turkish and Russian with its first meaning in English.

typhoon > (Tksh.) *tayfun*, (Russ.) *тайфун*

typhoon (BrE and AmE [tai'fu:n]): '1. a tropical cyclone or hurricane of the western Pacific area and the China seas. 2. a violent storm or tempest of India. 3. (cap.) Mil. a. a single-engine British ground attack aircraft of World War II. b. NATO's name for a class of nuclear-powered Soviet ballistic missile submarine carrying 20 multiwarhead missiles.' (Webster, 1996). The word 'typhoon' was transferred into Turkish with the first and second semantic fields of its English meaning, while in Russian, after being established with its first meaning, it expanded into new semantic fields, being used to denote 1) the currency of Taiwan and 2) the verb 'to make a ruckus'.

In some cases, the English sound /u:/ is preserved in Turkish, while in others, it has evolved into /o/ <o>.

food > (Tksh.) *fast food*

fast food (BrE ['fa:st fu:d], AmE ['fæstfu:d]): 'food, as hamburgers, pizza, or fried chicken, that is prepared in quantity by a standardized method and can be dispensed quickly at inexpensive restaurants for eating there or elsewhere' (Webster, 1996). The word 'fast food' is used with the same meaning in both Turkish and English. It has been partially borrowed into Turkish as "hazır yemek", meaning "ready meal".

hooligan > (Tksh.) *holigan*, (Russ.) *хулиган*

hooligan (BrE and AmE ['hu:lɪgən]): '*n.* 1. a ruffian or hoodlum. *adj.* 2. of or like hooligans. (Webster, 1996). The English word 'hooligan' has the same meaning in Turkish and Russian. In the Turkish version, which was adopted through the written form, the vowel clash in the unstressed syllable was resolved by dropping one of the vowels.

2.1.4. The omission of the letter <e> at the end of words of English origin in Turkish and Russian:

antifreeze > (Tksh.) *antifriz*, (Russ.) *антифриз*

antifreeze (BrE and AmE ['æn.ti.fri:z]): 'a liquid used in the radiator of an internal-combustion engine to lower the freezing point of the cooling medium

(Webster, 1996). The word “antifreeze” is used with the same meaning in Turkish, Russian and English.

slide > (Tksh.) *slayt*, (Russ.) *слайд*

slide (BrE and AmR[slaid]): ‘1. an act or instance of sliding. 2. a smooth surface for sliding on, especially a type of chute in a playground. 3. an object intended to slide. 4. Geol. a. a landslide or the like. b. the mass of matter sliding down. 5. a single transparency, object, or image for projection in a projector, as a lantern slide. 6. Photog. a small positive color transparency mounted for projection on a screen or magnification through a viewer. 7. a usually rectangular plate of glass on which objects are placed for microscopic examination. 8. Furniture a shelf sliding into the body of a piece when not in use. 9. Music a. an embellishment consisting of an upward or downward series of three or more tones, the last of which is the principal tone. b. a portamento. c. a U-shaped section of the tube of an instrument of the trumpet class, as the trombone, that can be pushed in or out to alter the length of the air column and change the. 10. a vehicle mounted on runners, for conveying loads, as of grain or wood, especially over a level surface. 11. (of a machine or mechanism a. a moving part working on a track, channel, or guide rails. b. the surface, track, channel, or guide rails on which the part moves. 12. any of various chutes used in logging, mining, or materials handling. 13. a flat or very low-heeled, backless shoe or slipper that can be slipped on and off the foot easily (Webster, 1996). The word slide is used with the same meaning in Turkish, Russian and English.

nickname > (Tksh.) *nicknam*, (Russ.) *никнейм, никнэйм*

nickname (BrE and AmE ['nikneim]): ‘1. a name added to or substituted for the proper name of a person, place, etc., as in affection, ridicule, or familiarity. 2. a familiar form of a proper name, as Jim for James and Peg for Margaret’ (Webster, 1996). The word nickname has the same meaning in Russian, Turkish and English.

2.2. Diphthongs

Vowels can be homogeneous in quality throughout their entire duration (monophthongs) or heterogeneous (diphthongs and diphthongoids). A diphthong is a heterogeneous vowel consisting of two more or less equal parts that form a single syllable (for example, the English /ou/ and /ai/ in the words *go*, *time*). A diphthongoid differs from a diphthong in that one of its parts is significantly shorter than the other. Russian has no diphthongs, but diphthongoids include, for example, the vowel /o/, which is pronounced as /^ʲo/, as well as all vowels, except for /u/, when followed by a soft consonant (for example, /^ʲa/ in the word *пятый*).

To accommodate the phonological constraints of Turkish, which lacks diphthongs, foreign words with diphthongs have undergone a phonological process known as vowel reduction. This involves the deletion of one of the vowels in the diphthong, typically in the initial, medial, or final position, to resolve the resulting vowel clash.

2.2.1. The English diphthong /eɪ/ mainly appears as /ej/ <e> and <й> in Russian and /ej/<e> and <y> in Turkish:

gay > (Tksh.) *gey*, (Russ.) *zeï*

gay (BrE and AmE [geɪ]): ‘*adj.* 1. having or showing a merry, lively mood. 2. bright or showy. 3. given to or abounding in social or other pleasures. 4. licentious; dissipated; wanton. 5. homosexual. 6. of, indicating, or supporting homosexual interests or issues. *n.* 7. a homosexual person, esp[ecially] a male.’ (Webster, 1996). The English word ‘gay’ is used as a noun in both Russian and Turkish, while in English it can be used as both a noun and an adjective. It was borrowed into Turkish and Russian with its seventh meaning in English.

spray > (Tksh.) *sprey*, (Russ.) *cnpeï*

spray (BrE and AmE [spreɪ]): ‘1. water or other liquid broken up into minute droplets and blown, ejected into, or falling through the air. 2. a jet of fine particles of liquid, as medicine, insecticide, paint, perfume, etc., discharged from an atomizer or other device for direct application to a surface. 3. a liquid to be discharged or applied in such a jet. 4. an apparatus or device for discharging such a liquid. 5. a quantity of small objects, flying or discharged through the air.’ (Webster, 1996). The English word ‘spray’ has been adopted into both Turkish and Russian, retaining its original meaning.

grader > (Tksh.) *greyder*, (Russ.) *zpeïdep*

grader (BrE [ˈgreɪdər], AmR [ˈgreɪdər]): ‘1. a person or thing that grades. 2. a pupil of a specified grade at school. 3. a machine for grading’ (Webster, 1996). The English word ‘grader’ has been borrowed into both Turkish and Russian, but with different meanings. In Turkish, it has adopted the first and third meanings from English, while in Russian, it specifically took on the third meaning.

In certain cases, the English diphthong /eɪ/ has been reduced to a simple /e/ sound in Turkish:

cake > (Tksh.) *kek*, (Russ.) *kek*

cake (BrE and AmE [keɪk]): ‘1. a sweet, baked, bread like food, made with or without shortening, and usually containing flour, sugar, baking powder or soda, eggs, and liquid flavoring. 2. a flat, thin mass of bread, esp[ecially] unleavened bread. 3. pancake; griddlecake. 4. a shaped or molded mass of other food. 5. a

shaped or compressed mass. 6. Animal Husb. a compacted block of soybeans, cottonseeds, or linseeds from which the oil has been pressed, usually used as a feed or feed supplement for cattle.’ (Webster, 1996). 7. ‘something easily done’ (Hornby, 2010). The English word ‘cake’ has been borrowed into Turkish, primarily with its first meaning. However, it has also acquired a unique seventh meaning, which is not documented in standard Turkish dictionaries. This colloquial usage, which equates ‘cake’ with a ‘fool’ or ‘simpleton’, is believed to have arisen through a process of personification. This is a clear example of semantic extension, as the word has developed a new meaning in Turkish that is not found in its English origin. In contrast, Russian has borrowed ‘cake’ with meanings related to industrial processes, specifically referring to the residue of certain substances.

2.2.2. The English diphthong /-əʊ-/ , /-ou-/ mainly appears as /o/ in Russian and in Turkish:

coach > (Tksh.) *koç*, (Russ.) *коуч*

coach (BrE [kəʊtʃ], AmE [koutʃ]): “1. a large, horse-drawn, four-wheeled. 2. a public motorbus. 3. Railroads day coach: a. an ordinary railroad passenger car, as distinguished from a sleeping car, parlor car, or other deluxe accommodations. b. the class of airline coach for daytime flight at regular fare. 4. Also called air coach. a class of airline travel providing less luxurious accommodations than first class at a lower fare. 5. a person who trains an athlete or a team of athletes. 6. a private tutor who prepares a student for an examination. 7. a person who instructs an actor or singer. 8. baseball a playing or nonplaying member of the team at bat who is stationed in the box outside first or third base to signal instructions to and advise base runners and batters. 9. Naut. an after cabin in a sailing ship, located beneath the poop deck, for use especially by the commander of the ship. 10. a type of inexpensive automobile with a box like, usually two-door, body manufactured in the 1920’s. 11. mobile home: a large house trailer, designed for year-round living in one place (Webster, 1996). 12. ‘life coach (also coach): a person who is employed by somebody to give them advice about how to achieve the things they want in their life and work’ (Hornby, 2010). Both Turkish and Russian have borrowed the English word ‘coach’, but Turkish has adopted both the fifth and twelfth meanings, whereas Russian has only adopted the fifth.

toast > (Tksh.) *tost*, (Russ.) *мочм*

toast (BrE [təʊst], AmE [toʊst]): ‘1. sliced bread that has been browned by dry heat’ (Webster, 1996), 2. ‘food prepared with toasted bread’ (Hornby, 2010). The English word ‘toast’ shares the same meaning in English and Turkish. However, in Russian, it has a broader meaning, encompassing both ‘a slice of toasted bread’ and ‘a speech made to honor someone.’

trench coat > (Tksh.) *trençkot*, (Russ.) *тренчком*

trench coat (BrE [trentʃ] [kəʊt], AmE [kooʔ]): ‘a waterproof overcoat styled along military lines, belted, with straps on the shoulders and lower sleeves’ (Webster, 1996). The English word ‘trench coat’ has the same meaning in English, Turkish, and Russian.

2.2.3. The English /æ/ has no equivalent in Russian, and thus it can be substituted in several ways /a/ <a>, /e/ <e>, /ɛ/ <э> and /a/ <a> in Tuurkish:

In about half of the examples, the “quasitranscribed” /e/ <e> or /ɛ/ <э> is used, in one-third of the English loanword the traditional transliterated a occurs, while the rest of English loanword demonstrates double or multiple alternations:

dancing > (Tksh.) *dancing*, (Russ.) *дэнсунг*

dancing (BrE ['da:nsɪŋ], AmE ['dænsɪŋ]): ‘moving your body to music’ (Webster, 1996). The Turkish meaning of the English word ‘dancing’ has diverged from its original meaning, now signifying a ‘public, paid dance hall’. In contrast, Russian has retained the original meaning of the word.

gag > (Tksh.) *gag*, (Russ.) *гэг*

gag (BrE and AmE [gæg]): ‘Informal 1. a joke, esp[ecially] one introduced into a script or an actor’s part. 2. any contrived piece of wordplay or horseplay’ (Webster, 1996). The English word ‘gag’ has the same meaning in English, Turkish, and Russian.

hands free > (Tksh.) *hands free*, (Russ.) *хэндс фру*

hands free (BrE and AmE ['hændsfri:]): ‘adj. not requiring the use of the hands. Also, handfree’ (Webster, 1996). The English term ‘hands-free’ has the same meaning in both English and Turkish. It was adopted into Turkish through the written word. In Russian, ‘hands-free’ has the following meanings: 1. auto. A type of equipment in a car that allows hands-free operation. 2. private communication. A hands-free telephone. 3. (private communication) Accessories for cell phones that allow you to communicate with the person you are talking to without holding the phone to your ear.

jet lag > (Tksh.) *jet-lag*, (Russ.) *джет-лэг*

jet lag (BrE and AmE [dʒet læg]): ‘a temporary disruption of the body’s normal biological rhythms after high-speed air travel through several time zones’ (Webster, 1996). The English word ‘jet lag’ has the same meaning in English, Turkish and Russian.

laptop > (Tksh.) *laptop*, (Russ.) *лантон*

laptop (BrE ['læptɒp], AmE ['læptɑ:p]): A computer that is small enough to be carried around easily and is designed for use outside an office.

2.3. Consonants

2.3.1. English /dʒ/ corresponds to the Russian letter combination dz/, /dʒ/ <дж> and Turkish /dʒ/ <c>:

jazz > (Tksh.) *caz*, (Russ.) джаз

jazz (BrE and AmE [dʒæz]): *n.* 1. music originating in New Orleans around the beginning of the 20th century and subsequently developing through various increasingly complex styles, generally marked by intricate, propulsive rhythms, polyphonic ensemble playing, improvisatory, virtuosic solos, melodic freedom, and a harmonic idiom ranging from simple diatonicism through chromaticism to atonality. 2. a style of dance music, popular especially in the 1920's, arranged for a large band and marked by some of the features of jazz. 3. dancing or a dance performed to such music, as with violent bodily motions and gestures. 4. Slang liveliness; spirit; excitement. 5. Slang insincere, exaggerated, or pretentious talk. 6. Slang similar or related but unspecified things, activities etc. *adj.* 7. of, pertaining to, or characteristic of jazz' (Webster, 1996). The English loanword 'jazz' was incorporated into both Turkish and Russian, predominantly conveying its primary musical meaning. Nevertheless, in Turkish, 'jazz' has undergone semantic extension to encompass the concept of a 'jazz band', a development attributable to the influence of the English compound 'jazz band'. This secondary meaning, derived from the abbreviated Turkish form 'jazzbant', is absent in English, where 'jazz' is strictly associated with the musical genre. In Russian, beyond its core musical meaning, 'jazz' has acquired additional connotations, including a reference to a character in the Transformers franchise and a colloquial meaning related to extravagant spending.

jazz band > (Tksh.) *cazbant*, (Russ.) джаз-ба(э)нд

jazz band (BrE and AmE ['dʒæmp fɒt]): 'a band specializing in jazz, and consisting typically of trumpet, trombone, clarinet, saxophone, piano, double bass, and percussion' (Webster, 1996). The English loanword 'jazz band' was incorporated into the Turkish and Russian lexicons, preserving its original denotation of a jazz musical ensemble. Nonetheless, both languages have witnessed semantic extensions and cultural specificities related to the term.

jump shot > (Tksh.) *cemşat*, (Russ.) джампуот

jump shot (BrE ['dʒæmp fɒt], AmE ['dʒæmp ʃɑ:t]): 'Basketball a shot with one or both hands in which a player leaps into the air and shoots the ball at the basket at the moment of reaching the highest point of the leap' (Webster, 1996). The English term 'jump shot' (combining 'jump' and 'shot') is used with the same

meaning in both English and Turkish. In Russian, however, it additionally has a specific meaning in computer gaming: 'a shot or the use of a skill by a character while jumping, often causing confusion to the enemy.'

jingle > (Tksh.) *cıngıl*; (Russ.) *джингл*

jingle (BrE and AmE ['dʒɪŋɡl]): '1. a tinkling or clinking sound, as of small bells or of small pieces of resonant metal repeatedly struck one against another 2. something that makes such a sound, as a small bell or a metal pendant. 3. a catchy succession of like or repetitious sounds, as in music or verse. 4. a piece of verse or a short song having such a catchy succession of sounds, usually of a light or humorous character. 5. Irish Eng. and Australian a loosely sprung, two-wheeled, roofed carriage, usually used as a hackney coach' (Webster, 1996), 6. 'a short song or tune that is easy to remember and is used in advertising on radio or television' (Hornby, 2010). The English loanword 'jingle', in its sixth semantic sense, was incorporated into both Turkish and Russian. However, in Russian, 'jingle' has undergone semantic extension to encompass a specific political connotation. It is employed to denote a musical composition or song associated with a political entity, particularly in the context of electoral campaigns, media promotions, and public rallies.

jeep > (Tksh.) *cip*, (Russ.) *джип*

Jeep (BrE and AmE [dʒi:p]): 'Trademark 1. a small, rugged military motor vehicle having four-wheel drive and a 1/4-ton capacity: widely used by the U.S. Army during and after World War II. 2. a similar vehicle used by civilians. Vehicle, or special use of Eugene the Jeep, name of fabulous animal in comic strip "Popeye" by E. C. Segar]' (Webster, 1996). The English word 'Jeep', which began as a proprietary name, has undergone a process of generification to encompass a category of rugged, all-terrain vehicles, particularly those associated with military use. This semantic shift has been observed in both Turkish and Russian.

The English phoneme /dʒ/ is retained in certain Turkish loanwords.

jersey > (Tksh.) *jersey*, (Russ.) *джерси*

jersey (BrE ['dʒɜ:zi], AmE ['dʒɜ:zi]): '1. a close-fitting, knitted sweater or shirt. 2. a plain-knit, machine-made fabric of wool, silk, nylon, rayon, etc., characteristically soft and elastic, used for garments. 3. (cap.) one of a breed of dairy cattle, raised originally on the island of Jersey, producing milk with a high butterfat content. [after Jersey]' (Webster, 1996). The English loanword 'jersey' has been incorporated into both Turkish and Russian, but with distinct semantic shifts. In Turkish, it aligns with the third English sense of the word, whereas in Russian, it corresponds to the second.

jet > (Tksh.) *jet*, (Russ.) *джет*

jet (BrE and AmE [dʒet]): *n.* 1. a stream of a liquid, gas, or small solid particles forcefully shooting forth from a nozzle, orifice, etc. 2. something that issues in such a stream, as water or gas. 3. a spout or nozzle for emitting liquid or gas. 4. *jet plane*: an airplane moved by jet propulsion. Also called *jet airplane*. 5. *jet engine*: an engine, as an aircraft engine, that produces forward motion by the rearward exhaust of a jet of fluid or heated air and gases. Also called *jet motor*. *adj.* 6. of, pertaining to, or associated with a jet, jet engine, or jet plane. 7. in the form of or producing a jet or jet propulsion. 8. by means of a jet airplane' (Webster, 1996). Although Turkish dictionaries state that the word 'jet' has English origins, the fact that the same word exists in French with a similar meaning ('jet' in French means 'a jet-powered aircraft, especially for passenger transport,' which is an Anglicism) raises the possibility that the word may have been borrowed into Turkish from French. In Russian, the word 'jet' has the following meanings: "(engine). 1. frequent. colloquial. Jet aircraft. 2. Brand name of gasoline of Continental Oil Holdings. 3. Dynamic washing system by direct injection of detergent solution onto laundry in the drum. 4. Type of lightning in the upper atmosphere."

jet lag > (Tksh.) *jet-lag*, (Russ.) *джет-лэг*

jet lag (BrE and AmE [dʒet læg]): 'a temporary disruption of the body's normal biological rhythms after high-speed air travel through several time zones' (Webster, 1996). The English term 'jet lag' exhibits semantic equivalence in Russian and Turkish.

2.3.2. English /tʃ/ is usually transcribed by Russian /t͡ʃ/ <ч>, in Turkish /tʃ/ (ch), /d͡ʒ/ <ç>, /t͡ʃ/ <ç> and /ʃ/ <ş>:

change > (Tksh.) *change*, (Russ.) *чейндж*

change (BrE and AmE [tʃeɪndʒ]): '1. the act or fact of changing; fact of being changed. 2. a transformation or modification; alteration. 3. a variation or deviation. 4. the substitution of one thing for another. 5. variety or novelty. 6. the passing from one place, state, form, or phase to another. 7. Jazz harmonic progression from one tonality to another; modulation. 8. the supplanting of one thing by another. 9. anything that is or may be substituted for another. 10. a fresh set of clothing. 11. money given in exchange for an equivalent of higher denomination. 12. a balance of money that is returned when the sum tendered in payment is larger than the sum due. 13. coins of low denomination. 14. any of the various sequences in which a peal of bells may be rung. 15. Also, *change*. Brit. *exchange*, *exchange rate*: the ratio at which a unit of the currency of one country can be exchanged for that of another country. Also called *rate of exchange*. 16. Obs. *changefulness*; *caprice*' (Webster, 1996). The English loanword 'change' has

been incorporated into both Turkish and Russian, but with distinct semantic shifts. In Turkish, it aligns with the 11th English sense of the word, whereas in Russian, it corresponds to the 7th, 11th, and 12th senses.

chat > (Tksh.) *chat*, (Russ.) *чам*

chat (BrE and AmE [tʃæt]): '1. informal conversation. 2. any of several small Old-World thrushes, esp[ecially] of the genus *Saxicola*, having a chattering cry. 3. yellow-breasted chat: an American warbler, *Icteria virens*, having a yellow throat and breast and greenish-brown upper parts and noted for imitating the songs of other species' (Webster, 1996), 4. 'online discussion in a chat room; also: an instance of such discussion' (Hornby, 2010). The English loanword 'chat' has been incorporated into both Turkish and Russian, aligning with the fourth English sense of the word.

check-in > (Tksh.) *check-in*, (Russ.) *чекин, чек-ин*

check-in (BrE and AmE [ˈtʃekɪn]): '1. the act or fact of checking in' (Webster, 1996), 2. 'the place where you go to at an airport to leave your suitcases, etc. and show your ticket. 3. the act of confirming your intention to take a particular flight and your personal details either at an airport or using a computer' (Webster, 1996). The English loanword 'check-in' has been incorporated into both Turkish and Russian, but with distinct semantic shifts. In Turkish, it aligns with the first English sense of the word, whereas in Russian, it corresponds to all three English senses.

checkout > (Tksh.) *check-out*, (Russ.) *чекаут, чек-аут*

checkout (BrE and AmE [ˈtʃekaʊt]): '1. the procedure of vacating and paying for one's quarters at a hotel. 2. the time before which a hotel room must be vacated if another day's charge is not to be made. 3. an examination of fitness for performance. 4. a series of sequential actions to familiarize oneself with new equipment. 5. itemization and collection of amounts due for purchases. 6. Also called checkout counter, a counter where customers pay for purchases. Also, check-out' (Webster, 1996). The English loanword 'check-out' has been incorporated into both Turkish and Russian, but with distinct semantic shifts. In Turkish, it aligns with the first English sense of the word, whereas in Russian, it corresponds to the first and sixth English senses.

checkpoint > (Tksh.) *check-point*, (Russ.) *чекпойнт, чек-пойнт*

checkpoint (BrE and AmE [ˈtʃekpɔɪnt]): '1. a place along a road, border, etc., where travelers are stopped for inspection. 2. a point or item, esp[ecially] in a procedure, for notation, inspection, or confirmation' (Webster, 1996). The English word 'checkpoint' has been borrowed into Turkish with its first English meaning. The Turkish word is a direct translation of the English term. In Russian,

'checkpoint' has a broader range of meanings, including: 1. (rare, youth slang) A meeting place. 2. (computer) A penalty point in a computer game against the clock. 3. (general) A checkpoint (as in a military or security context). 4. (sport) A specific location on the ground, indicated on a map or otherwise, that must be found and marked during a competition. 5. (advertising) An advertising structure, typically a flat box with four sides, placed on security systems at store exits. This 'checkpoint frame' serves as an advertising space, attracting attention both to those entering the store and those waiting in line.

chips > (*Tksh.*) *cips*, (*Russ.*) *чипсы*

chips (BrE and AmE [tʃɪps]): 'Chiefly Brit. French fries' (Webster, 1996). The English term 'chips' exhibits semantic equivalence in Russian and Turkish.

Charleston > (*Tksh.*) *Çarliston*; (*Russ.*) *Чарльстон*

Charleston (BrE ['tʃɑ:lstən], AmE ['tʃɑ:rlstən]): (I) '1. a seaport in SE South Carolina. 69,510. 2. a city in and the capital of West Virginia, in the W part. 63,968. 3. a city in E central Illinois. 19,355'; *Charleston* (II) 'a vigorous, rhythmic ballroom dance popular in the 1920's [named after Charleston, South Carolina]' (Webster, 1996). The English word 'Charleston', originating from the city of Charleston in the United States, has undergone semantic expansion, particularly in Turkish. While the term 'Charleston' in Turkish and Russian primarily refers to the dance originating from the city, Turkish has developed additional meanings such as 'Charleston music', 'Charleston pepper', and metaphorical uses like 'slender, tall' and 'stylish, dandy'. These additional meanings, absent in English, suggest a semantic extension within Turkish.

check > (*Tksh.*) *çek*, (*Russ.*) *чек*

check (BrE and AmE [tʃek]): *n.* 1. Also, Brit., cheque. Banking a written order, usually on a standard printed form, directing a bank to pay money. 2. a slip or ticket showing the amount owed, esp[ecially] a bill for food or beverages consumed. 3. a ticket or token that when matched with a counterpart identifies an article left in the temporary custody of another, the purchaser of a ticket, a person who is to be served next, etc. 4. a criterion, standard, or means to insure against error, fraud, etc. 5. an inquiry, search, or examination. 6. Also called check mark (check mark da denir). a mark, often indicated by (/), as on a list, to indicate that something has been considered, acted upon, or approved. 7. a person or thing that stops, limits, slows, or restrains. 8. a sudden arrest or stoppage; repulse; rebuff. 9. a control, test, or inspection that ascertains performance or prevents error. 10. a pattern formed of squares, as on a checkerboard. 11. one of the squares in such a pattern. 12. a fabric having a check pattern. 13. Chess the exposure of the king to direct attack. 14. Ice Hockey any of several maneuvers designed to obstruct or impede the forward progress of an opponent. 15. a counter used in card games,

as the chip in poker. 16. a small crack. 17. an egg, designated for market, having a slightly cracked shell and an intact inner membrane. 18. Masonry a rabbit-shaped cutting on the edge of a stone, by which it is fitted to another stone. 19. Hunting a). the losing of the scent by a dog or pack. b). (in fox hunting) a period in a hunt, following the losing of the scent by the hounds, during which the field rests quietly while the hounds cast to regain the scent. *adj.* 20. serving to check, control, verify, etc. 21. ornamented with a checkered pattern; checkered' (Webster, 1996). The English loanword 'check' has been incorporated into Turkish, aligning with its first and second English senses. However, in Russian, 'check' has undergone semantic shift, acquiring a specialized agricultural meaning related to flooded rice paddies.

2.3.3. English letter <x> is missing from both Russian and Turkish, it is generally substituted by Russian /ks/ and Turkish /ks/:

mixer > (Tksh.) *mikser*, (Russ.) *миксер*

mixer (BrE ['mɪksə], AmE ['mɪksər]): '1. a person or thing that mixes. 2. a person, with reference to sociability. 3. a kitchen utensil or an electrical appliance having one or more beaters and used in mixing, beating, or blending foods. 4. Also, mix. a beverage, as ginger ale, fruit juice, or soda water that can be combined with liquor to produce a mixed drink, esp[ecially] a highball. 5. Audio an electronic device for blending, fading, substitution, etc., of sounds from various sources, as from microphones or separately recorded soundtracks, for broadcast or recording. 6. Radio and Television, Recording a technician who operates a mixer in a studio. 7. the person responsible for the original recording of a movie soundtrack. 9. mixing faucet: a single outlet for water from separately controlled hot-water and cold-water taps. 10. Metall. a container for blending and storing molten pig iron from several blast furnaces' (Webster, 1996). While 'mixer' primarily refers to a device for blending substances in English, in Turkish and Russian, it has taken on an additional meaning in the construction industry, where it is used to denote a concrete mixer. This usage is a truncated form of the English equivalent. Turkish, in particular, showcases semantic flexibility by extending the meaning of 'mixer' to encompass both its original and this new, specialized meaning.

reexport > (Tksh.) *reeksport*, (Russ.) *реэкспорт*

reexport (BrE [ˌriːɪk'spɔːt], AmE [ˌriːɪk'spɔːrt]): '1. the act of reexporting. 2. a commodity that is reexported' (Webster, 1996). The English loanword 'reexport' has been incorporated into Turkish and Russian, aligning with its primary English sense.

relax > (Tksh.) *relaks*, (Russ.) *релакс*

relax (BrE and AmE [rɪ'læks]): 'v.i. 1. to become less tense, rigid, or firm. 2. to become less strict or severe; grow milder. 3. to reduce or stop work, effort, application, etc., esp[ecially] for the sake of rest or recreation. 4. to release oneself from inhibition, worry, tension, etc.' (Webster, 1996). The English verb 'relax' corresponds to the noun 'relaxation'. We assume that this word entered Turkish as the verb 'relaks olmak' and subsequently, the noun form 'relaks' was adopted to convey the same meaning. Thus, the transformation is English 'relax' *v.* → Turkish 'relaks olmak' → Turkish 'relaks' *n.* (Webster, 1996). In Russian, it is used as a noun.

remix > (Tksh.) *remiks*, (Russ.) *ремикс*

remix (BrE and AmE ['ri:miks]): 'a remixed recording' (Webster, 1996), 'a variant of an original recording (as of a song) made by rearranging or adding to the original' (Hornby, 2010). The English loanword 'remix' has been incorporated into Turkish and Russian, aligning with its primary English sense.

sexy > (Tksh.) *seksi*, (Russ.) *сексу*

sexy (BrE and AmE ['seksi]): '*adj.* 1. concerned predominantly or excessively with sex; risqué. 2. sexually interesting or exciting; radiating sexuality. 3. excitingly appealing; glamorous' (Webster, 1996). The English loanword 'sexy' has been incorporated into Turkish and Russian, aligning with its primary English sense.

Although the English glottal /h/, absent from the borrowing language, had caused serious problems before, nowadays it is generally substituted by Russian /x/:

hard rock > *xapð-pok*, *hip-hop* > *xun-xon*, *hot dog* > *xom-ðoɔ*.

The letter /г/, which was common in earlier borrowings from Western European languages containing *h* in their original form, appears in new loanwords only if the English loanword contains an element of Latin origin (гипер) or a Western European geographical name (Гамбург):

hypertext > *гипертекст*, *hamburger* > *гамбургер*.

2.3.4. The phoneme /w/, absent in both Russian and Turkish phonological systems, is often realized as /В/ «В» and /v/ in these languages. In certain Russian contexts, a sound changes from /w/ to /y/ may occur.

forward > (Tksh.) *forvet*, (Russ.) *форвард*

forward (BrE ['fɔ:wəd], AmE ['fɔ:rwəd]): '*adj.* 1. directed toward a point in advance; moving ahead; onward. 2. being in a condition of advancement; well-advanced. 3. ready, prompt, or eager. 4. presumptuous, impertinent, or bold. 5.

situated in the front or forepart. 6. of or pertaining to the future; for the future or forward delivery. 7. lying ahead or to the front. 8. radical or extreme, as persons or opinions. *n.* 9. Sports a). a player stationed in advance of others on a team. b). Football a lineman. c). Basketball either of two players stationed in the forecourt. 10. Finance something bought, as a security, for future delivery' (Webster, 1996). The English term 'forward' has been adopted into Turkish, primarily to convey the meanings of a 'forward player' and a 'forward position' in sports, specifically football. These terms align with senses 9a and 9c in English. In Russian, the word has been borrowed with a broader range of meanings, including the first, 9a, and 10th senses found in English.

watt > (Tksh.) *vat*, (Russ.) *watt*

watt (BrE [wɒt] AmE [wɑ:t]): 'the SI unit of power, equivalent to one joule per second and equal to the power in a circuit in which a current of one ampere flows across a potential difference of one volt *vat*. The unit of power, 'watt', is used identically in English, Turkish, and Russian.

show > (Tksh.) *šov*, (Russ.) *uoy*

show (BrE [ʃəʊ], AmE [ʃoʊ]): '1. a theatrical production, performance, or company. 2. a radio or television program. 3. a motion picture. 4. an exposition for dealers or the public of products by various manufacturers in a particular industry, usually held in an exhibition hall, convention facility, or the like. 5. any kind of public exhibition or exposition. 6. ostentatious display. 7. a display, exhibition, or demonstration. 8. an indication; trace. 9. the position of the competitor who comes in third in a horse race, harness race, etc. 10. appearance; impression. 11. a sight or spectacle. 12. an unreal or deceptive appearance. 13. an act or instance of showing. 14. a motion-picture theater. 15. Informal a chance. 16. *med.* a). the first appearance of blood at the onset of menstruation. b). a blood-tinged mucous discharge from the vagina that indicates the onset of labor. 17. Chiefly Brit. Informal any undertaking, group of persons, event, etc.; affair; thing' (Webster, 1996). The English word 'show' has been adopted into both Russian and Turkish, primarily conveying its 2nd and 4th meanings.

showman > *šovmen*; (Russ.) *шоумен*

showman (BrE ['ʃəʊmən], AmE ['ʃoʊmən]): '1. a person who presents or produces a show, esp[ecially] of a theatrical nature. 2. a person who is gifted in doing or presenting things theatrically or dramatically' (Webster, 1996). The word 'showman' has the same meaning in English, Turkish and Russian.

3. In Turkish and Russian, English words ending in “ss” change to “s”.

fiberglass > (Tksh.) *fiberglas*, (Russ.) *фиберглас*

fiberglass (BrE ['faɪbəglɑ:s], AmE ['faɪbərglæs]): 'a material consisting of extremely fine filaments of glass that are combined in yarn and woven into fabrics, used in masses as a thermal and acoustical insulator, or embedded in various resins to make boat hulls, fishing rods, and the like (Webster, 1996). In Turkish and Russian, words cannot end with identical consonants, so pairs like -ss become -s.

2.5.6. In Turkish and Russian, English words ending in /ll/ change to /l/.

full > (Tksh.) *ful*, (Russ.) *фыл*

full (BrE and AmE [fʊl]): *adj.* 1. completely filled; containing all that can be held; filled to utmost capacity. 2. complete; entire; maximum. 3. of the maximum size, amount, extent, volume, etc. 4. (of garments, drapery, etc.) wide, ample, or having ample folds. 5. abundant; well-supplied. 6. filled or rounded out, as in form. 7. engrossed; occupied. 8. of the same parents. 9. Music ample and complete in volume or richness of sound. 10. (of wines) having considerable body. 11. Baseball (beyzbol) a. (of the count on a batter) amounting to three balls and two strikes. b. having base runners at first, second, and third bases; loaded. 12. being slightly oversized, as a sheet of glass cut too large to fit into a frame. 13. Poker of or pertaining to the three cards of the same denomination in a full house. *n.* 14. the highest or fullest state, condition, or degree (Webster, 1996). The word full has passed into Turkish with its 1st, 2nd, 3rd meanings in English. It has passed into Russian with its 2nd and 11th meanings.

Some words that contain the /ll/ sound in the middle of a word in English are preserved in Turkish and Russian.

billboard > (Tksh.) *billboard*, (Russ.) *билборд*

billboard (BrE ['bɪlbɔ:d], AmE ['bɪlbɔ:rd]): 'a flat surface or board, usually outdoors, on which large advertisements or notices are posted (Webster, 1996). The English word billboard is used in the same sense in Turkish and Russian.

4. The “ff” in the middle and end of words in English turns into “f” in Russian and Turkish:

offset > (Tksh.) *ofset*, (Russ.) *офсет*

offset (BrE ['ɒfset], AmE ['ɔ:fset]): '(Also called offset printing, offset lithography. Lithog.) 1. a process in which a lithographic stone or metal or paper plate is used to make an inked impression on a rubber blanket that transfers it to the paper being printed, instead of being made directly on the paper. 2. the impression itself.' (Webster, 1996). The English word offset is used in the same sense in Turkish and Russian.

skiff > (Tksh.) *skif*, (Russ.) *скуф*

skiff (BrE and AmE [skɪf]): ‘any of various types of boats small enough for sailing or rowing by one person’ (Webster, 1996). ‘a small light boat for rowing or sailing, usually for one person’ (Hornby, 2010). The word skiff is used with the same meaning in Turkish, Russian and English.

sheriff> (Tksh.) *şerif*, (Russ.) *уеууф*

sheriff (BrE and AmE [ˈʃerɪf]): ‘1. the law-enforcement officer of a county or other civil subdivision of a state. 2. formerly an important civil officer in an English shire’ (Webster, 1996). The English word sheriff is used in the same sense in Turkish and Russian.

3. Conclusions

In this study, I attempted to show the phonetic and semantic changes in words that passed from English to Russian and Turkish. The material was collected by scanning Turkish, Russian and English dictionaries, and then classifying the excerpted words. I focused on those English words which underwent the same phonetic changes when passing to Russian and Turkish. The paper considers changes to vowels and consonants, the status and adaptation of diphthongs, as well as deletions of vowels and consonants. The following conclusions can be drawn from the examined words:

The vowel long /i:/ is present in English but it is absent from both Turkish and Russian phonological inventories. Consequently, loanwords containing this vowel undergo a phonological adaptation, typically resulting in it being realized as a short /i/. Furthermore, in Russian, this sound may occasionally be approximated by the vowel [e].

Since the English [ɜ:] sound is absent from both Turkish and Russian, it is transformed in loanwords, respectively into /œ/ <ö> and /ø/ <ë>. However, in both Russian and Turkish, the original English sound is retained.

The [u:] sound in English is not present in Turkish and Russian. It is transformed into a short /u/ <y>, <u> in both. In some cases, the [u:] sound is preserved in Turkish, while in others, it has evolved into /o/ <o>.

Turkish does not have diphthongs. Therefore, in loanwords containing diphthongs, either the first vowel of the diphthong is preserved, or /j/ <y> is added next to the first vowel of the diphthong. The consonant <y> is used in Turkish to prevent the clash of two vowels. Russian has no diphthongs too, but diphthongoids include, for example, the vowel [o], which is pronounced as [ʷo], as well as all vowels, except for /i/ [ɪ], when followed by a soft consonant. In some cases, the diphthongs in Russian can be substituted with /a/ <a>, /e/ <e>, /ɛ/ <э>:

Unlike English and Russian, Turkish does not typically allow two consonants to occur consecutively at the beginning of a word. Therefore, in loanwords containing consonant clusters, Turkish either preserves the original cluster, substitutes it with a single consonant, or epenthesizes a vowel between the consonants.

The phoneme /w/, absent from both Russian and Turkish phonological systems, is often realized as /v/ <v>, <В> in these languages. In certain Russian contexts, a sound change from /w/ to <u> may occur.

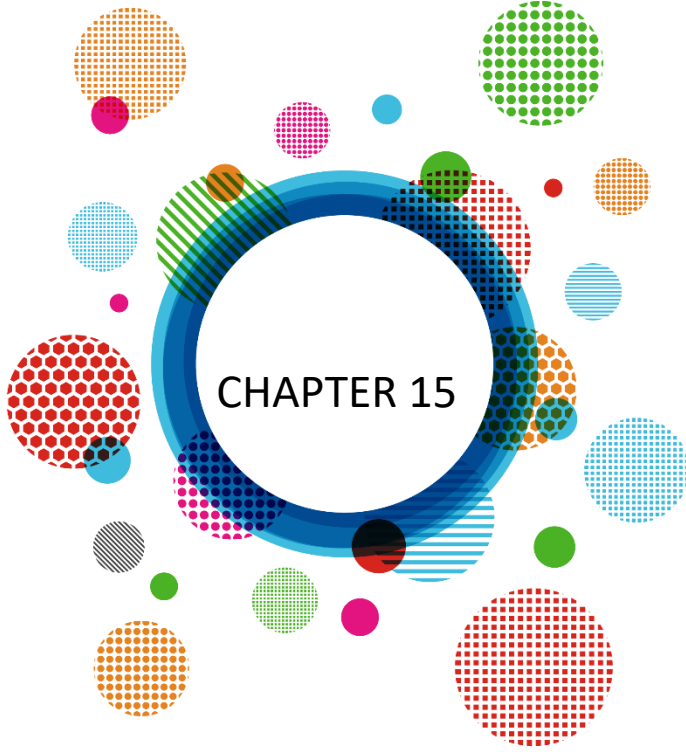
The English orthographic rule of doubling final consonants 'f,' 'l,' 's,' and occasionally 'z' following a single vowel in monosyllabic words is not applicable to Turkish and Russian. These languages typically reduce such consonant clusters by deleting one of the duplicated consonants.

Based on the words examined in this paper, loanwords generally entered Russian and Turkish with the most commonly used meaning in English. To distinguish meaning between a native term and loanword, or the meaning of the loanword in the donor and recipient languages, abstract types of internal as well as external situation must be attempted.

These phonological and semantic adaptations highlight the importance of considering language-specific phonetic inventories and semantic contexts when developing effective translation methods. Translators must be aware of these systematic changes to ensure accurate and culturally appropriate transfer of meaning between English, Russian, and Turkish.

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Training Large Language Models

Erhan Ustaoglu¹

¹ Assoc. Prof. Dr. Marmara University, Management Information Systems
ORCID: 0000-0002-9077-4370

INTRODUCTION

It had always been a dream among scientists and researchers to build machines which can communicate with humans just in the way humans communicate between themselves. However, this task required facing many difficulties for bridging the gap between how human and the computer communicate. All the emerging efforts to overcome these hurdles can be considered to constitute the field of science which we call Natural Language Processing (NLP) today. Countless algorithms and techniques have been developed and employed in order to perform the tasks like language translation, text summarization or question and answering. Early NLP developments are based mostly on rule-based algorithms related to linguistic phenomena. But this has changed in 1970s with introduction statistical methods to the field. This marked the beginning of statistical NLP which uses probabilistic modeling, information theory and linear algebra to analyze and process language data. Since then, statistical techniques such as N-gram language models, Hidden Markov Models and probabilistic parsing have been used effectively in various NLP applications (Manning, & Schütze, 1999).

Although the statistical methods have given the research in NLP a boost in the last quarter of the 20th century, developments in the way getting to a humanlike computer communication struggled until the development of deep learning neural network architectures. In particular, the effectiveness of Recurrent Neural Networks (RNNs) in capturing the sequential nature of language and the success of architectures such as Long ShortTerm Memory (LSTM) in overcoming the limitations of traditional RNNs in handling long-range dependencies have led to much better performance in tasks such as machine translation (Sutskever, Vinyals & Le, 2014). These architectures, together with Gated Recurrent Units (GRUs), have been used extensively in NLP, especially in sentiment analysis, machine translation, sequence generation and text classification (Graves, 2013; Cho et al., 2014; Ma et al., 2018; Kowsari et al., 2019).

1 TRANSFORMER ARCHITECTURE

NLP techniques based RNN, LSTM or variations of these models had been the focus of research until 2017 when a new perspective brought up called the Transformer (Vaswani et al., 2017). Until then research had been mostly focused on mitigating the shortcomings of RNN and LSTM like poor handling of long-range dependencies or vanishing gradient problems. Transformers, which are trained on massive datasets, on the contrary, have proven to be very effective in computer communication tasks, opening up new possibilities in many areas that were unforeseen until recently. In other words, they have transformed the way we interact with and benefit from AI (Zhu et al., 2023).

The main innovation introduced by Transformers is the self-attention mechanism, which allows the model to weigh the importance of different words in a sentence when making predictions. By calculating the attention scores between words in a sentence, the model allows the importance of different words to be determined when building representations. Unlike RNNs, this mechanism helps the model to focus on relevant parts of the input sequence without the need for sequential processing. Furthermore, Transformers process the entire input sequence simultaneously, making the training phase for long sequences much faster and more efficient than RNNs and LSTMs.

Transformers are configured as an encoder-decoder model. Both encoder and decoder blocks consist of several layers (usually 6-12) of self-attention and Feed-Forward Networks (FFN). Figure 1 shows the Transformer architecture, first proposed as a translation model. The left half of the figure shows the encoder part where the text to be translated into another language is input and the right half shows the decoder part where the translated text is predicted. Although the Transformer architecture was first proposed as a translation model, it has since found many applications, leading to the development of LLMs such as GPT (generative pretrained transformers) (Radford et al., 2018) and BERT (bidirectional encoder representations from transformers) (Devlin et al., 2019).

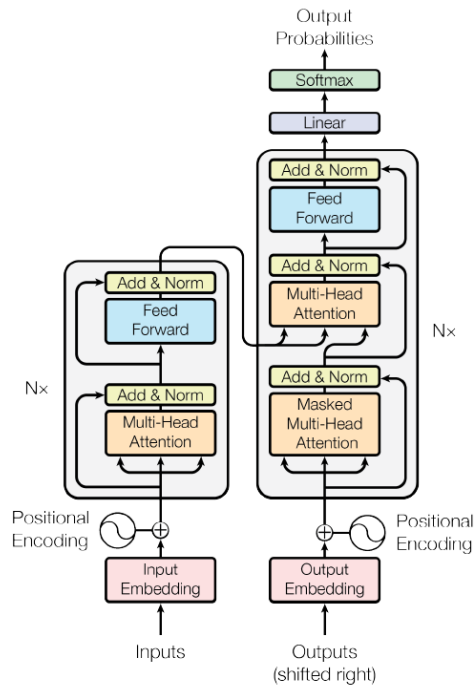


Figure 1 Transformer Architecture (Vaswani et al. in 2017)

1.1 Transformer Workflow

The input sequence to the encoder part of the transformer is tokenized first and subjected to input embedding and positional encoders. The result is a dense numerical representation of the input sequence, where each token is represented as context-aware vector that encodes the meaning of a token at a specific position. In other words, these numerical representations include both semantic meaning and positional information. The result is then passed to the self-attention and FFN layers. The final output of the encoder is a sequence of context-sensitive representations of the input tokens. The target sequence and the output of the encoder are fed to the decoder. During training, the target sequence is shifted by one token and the decoder learns to predict the next token by looking at previous tokens. The input is first passed through multiple layers of self-attention, masked to ensure that the model only pays attention to past tokens. Then comes an encoder-decoder attention layer where the decoder pays attention to the output of the encoder. Finally, the output passes through an FFN and is used to predict the next token in the sequence.

1.1.1 Tokenization

The input text to the Transformer is first broken down into smaller units called tokens which can be words, sub words or characters, depending on the tokenization method used. The most common tokenization approaches for modern LLMs are sub word tokenization methods such as Byte Pair Encoding (BPE) (Sennrich et al., 2015), WordPiece (Yuan et al., 2016), Sentencepiece (Kudo & Richardson, 2018). These approaches aim to strike a balance between efficiency (not too many tokens) and flexibility (handling rare and uncommon words).

1.1.2 Input Embedding and Positional Encoding

Each token in the input text is mapped to a vector using a lookup table (embedding matrix). Initially, these vectors are randomly assigned, but during training, each row is refined to correspond to a token vector in the vocabulary. Since transformers cannot process indexical data, which encodes the position of elements in a sequence, like RNNs, positional encodings need to be added to the token embeddings. These encodings represent the position of the token in the sequence, allowing the model to capture sequential relationships. The token and the positional encoding are then combined and passed to the transformer layers.

1.1.3 Masked Multi-head Attention:

Attention is a mechanism that allows a model to focus on different parts of the input while producing output that has the basic idea of enabling the model to weigh the importance of different tokens in the input sequence when making

predictions for a given token in the output sequence, even if they are far apart. By dynamically learning the weights (attention scores), the mechanism computes a weighted sum of the input vectors (token vectors). The model decides which parts of the input should be paid attention to, based on the current context. The Multi-head Attention mechanism increases the capacity of the model by enabling parallel learning of different relationships between tokens where the mask allows the model to learn to predict the next token based only on past tokens, ignoring future tokens during training.

1.1.4 Feed-forward Network (FFN)

While the Attention mechanism calculates the weighted sums of input tokens linearly, FFNs apply a non-linear transformation, allowing the model to better capture complex, non-linear patterns in the data. Without FFNs, the model would only be able to make linear combinations of input features, limiting its ability to model complex relationships in the data. The FFN consists of two linear layers with a non-linearity in between introduced by an activation function which allows the network to capture complex relationships in language structures.

1.1.5 Residual Link and Normalization

Each sublayer in both the encoder and decoder (self-attention and FFN) includes a residual link followed by layer normalization. The residual link helps stable training by mitigating the vanishing gradient problem and preserving information flow across layers without which repeated transformations might distort or lose critical input information. Layer normalization, on the other hand, ensures that the outputs of each layer have a consistent distribution, contributing to training stability and speed. Without normalization, deep networks would suffer from unstable weight updates which could be critical for Transformers with 100+ layers by maintaining stable gradients.

2 TRAINING OF LLMs

LLMs like GPT-3, BERT, and T5 are implementations of the Transformer architecture. These models use the Transformer's encoder (as in BERT) or decoder (as in GPT) or both (as in T5), and they are trained with billions of parameters and vast amounts of data.

While the Transformer architecture itself defines how data is processed (using self-attention, feed-forward networks, etc.), an LLM is defined by the scale of its parameters, the volume of training data, and the diverse range of tasks it can perform. For example, GPT-3 has 175 billion parameters. BERT is pretrained on huge corpora like Wikipedia and fine-tuned for specific NLP tasks. These large-scale models are called LLMs because of their massive parameter count and ability to perform a variety of language tasks.

LLMs are pretrained on vast datasets containing text from the internet, books, articles, and other sources. This large-scale training is what makes them powerful in handling many natural language tasks (like text completion, summarization, etc.) with impressive accuracy. Training a Large Language Model (LLM) typically follows a multi-stage process, each designed to build capability, improve alignment, and specialize the model for downstream tasks. Although LLM training naturally include data collection, preprocessing and evaluation stages too, a typical LLM training lifecycle has mainly the stages shown in Figure 2.

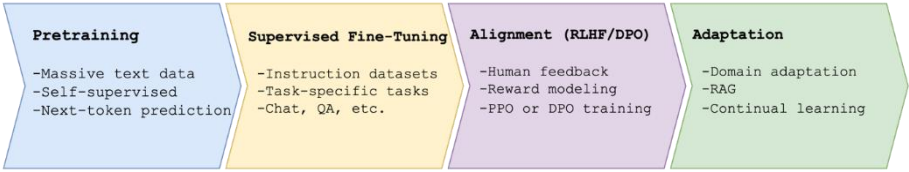


Figure 2 LLM Training Phases

2.1 Pretraining

After data collection and preprocessing the model is trained on a large text corpus in an unsupervised manner (e.g., predicting the next word or masked word in a sentence) through which the model learns general language patterns from massive unlabeled text data. The data used for this process is collected from diverse sources like books, websites, academic papers, Wikipedia, Common Crawl, GitHub, code repositories, etc. and cleaned and deduplicated before fed into the training phase of the LLM. As the result of the pretraining a general-purpose language model with billions (or trillions) of parameters is achieved.

Different training techniques have been deployed for pretraining of transformer based LLM architectures. One of these models is Masked Language Modeling (MLM), which is a self-supervised learning technique, involving randomly masking (hiding) parts of the input text and training the model to predict the missing tokens based on the surrounding context. MLM was first used in Bidirectional Encoder Representations from Transformers BERT (Devlin et al., 2019). Since then, the BERT has been extensively used in many applications.

2.2 Fine-tuning

Pretrained models, no matter how large they could be, do not naturally match up with the human requirements and can still generate outputs that are unaligned with user’s intentions. Therefore, the pretrained models need to be then fine-tuned on specific datasets for various tasks, such as question-answering, translation, or summarization. Fine-tuning stage makes the model better at

following explicit instructions and aligns model behavior to be more helpful and safe. The specific datasets with which the LLM is fine-tuned often includes human-labeled data (Zhang et al., 2023).

Conventional fine-tuning techniques keep all the model parameters, and hence the fine-tuning with specific data is still costly as pretraining. Instead, LoRA introduces small, trainable low-rank matrices into transformer layers that approximate the weight updates needed for adaptation, reducing the cost of fine-tuning by one third, (Hu et al., 2022). Multi-task learning (MTL), on the other hand, trains a single pretrained LLM on multiple related tasks simultaneously, enabling the model to share representations across tasks and improve generalization (Luo et al., 2023). It has also been shown that LoRa and MTL can be employed together and produce results comparable to full fine-tuning (Xin et al., 2024).

2.3 Alignment

Pretrained and fine-tuned LLMs can still produce outputs that could be unhelpful, biased, or untruthful. In order to address such challenges, some techniques, which align the model's behavior with human preferences, are often employed. These techniques help the model follow social norms and user expectations. RLHF Reinforcement Learning from Human Feedback (RLHF) is one of these techniques, which is commonly deployed. RLHF can be considered to be a part of the fine-tuning but it is commonly seen as a separate phase. Humans rank model responses from best to worst for a given prompt and a reward model is trained which predicts how much a response is *liked* based on human feedback (Ouyang et al., 2022). Then the model is fine-tuned using the reward model as a guide with an algorithm called Proximal Policy Optimization (PPO), which updates the model based on reward signals (Schulman et al., 2017).

Another alignment method, **Direct Preference Optimization (DPO)**, offers a more straightforward and stable supervised learning approach, in contrast to PPO. It directly trains the model using pairwise preference data, eliminating the need for complex reinforcement learning setups (Rafailov et al., 2023). This simplicity and efficiency have made DPO an attractive choice for open-source LLM projects recently. These open-source models have been shown to outperform other LLMs like in various benchmarks, including code generation, mathematics, and open-ended reasoning tasks (Bi et al., 2024). Adoption of DPO reflects a growing trend in the AI community to explore and implement alternative alignment strategies that balance performance with ease of implementation.

2.4 Post-training / Adaptation

LLMs although pretrained, fine-tuned and aligned for human preferences, still need to be adapted for better performances in specialized fields using methods like domain adaptation (e.g., legal, medical), Retrieval-Augmented Generation (RAG) or continual learning (refreshing knowledge without forgetting).

These methods illustrate various strategies for adapting LLMs to specialized domains. **Pretraining on domain-specific corpora**, which trains models from scratch or continue pretraining on domain-specific data to enhance their understanding of specialized terminology and context, are widely used (Gu et al., 2021; Yuan et al., 2022; Niyogi & Bhattacharya, 2024). Mixed-domain training, on the other hand, uses corpora that combine multiple related domains to improve generalization across domains, Hua et al., 2023). RAG, which incorporates external domain-specific knowledge bases to provide context and reduce hallucinations in generated content, is also widely deployed to improve the efficiency of LLMs (Gupta et al. 2024).

3 LLM TRAINING TECHNIQUES

An analysis has shown that the cost of training state-of-the-art AI models has risen dramatically in recent years. These cost account for hardware, energy, cloud rental, and labor, AI accelerator chips and personnel costs are being the most significant ones. If this trend continues, the largest training runs will cost more than a billion dollars by 2027, meaning that only the most financially strong organizations will be able to afford Frontier AI models (Cottier et al., 2024). On the other hand, since training LLMS is expensive because it requires a lot of computational resources, mainly GPUs or TPUs, and time, researchers have been heavily studying the ways of increasing the efficiency of training hence reducing the cost. The areas of this research focus on making the training process more efficient, using fewer resources, or finding ways to get the same performance with less data or computation. The recent trends of this research focus on several key areas which can be listed as follows:

Efficient Transformers: aim to fix a bottleneck of the original transformer architecture (Vaswani et al., 2017) which, has a quadratic complexity in its attention mechanism. In LLMs, when sequences get longer such as more than 2048 tokens, this becomes intractable and could be solved by modifying attention computation. The most common efficient transformers mechanisms are sparse and linear (Zaheer et al., 2020; Beltagy, Peters & Cohan, 2020).

Mixture of Experts (MoE): activates only a subset of the model for each input that reduces computing requirements while keeping parameter count high. The **first major application of MoE** in the context of **LLMs** came with the release of Switch Transformer which introduced a simplified and scalable MoE

architecture. The Switch Transformer achieved considerable speed increases at pretraining where each transformer layer has multiple expert feedforward networks (FFNs) and only one expert is activated for each token (Fedus, Zoph & Shazeer, 2022).

Knowledge Distillation (KD) : is a model compression technique where a smaller, more efficient model is trained to mimic the behavior of a larger, more complex model. In the context of LLMs, KD enables the transfer of capabilities such as reasoning, language generation, and task-specific performance from massive proprietary models to smaller open-source models or domain-specific variants, reducing computational costs while preserving performance (Hinton, Vinyals & Dean, 2015). The first implementation of knowledge distillation in the context of LLMs was done in DistilBERT, marking a pivotal moment in making large transformer-based models more efficient and production-ready (Sanh et al., 2019).

Parameter-Efficient Fine-Tuning: optimizes LLMs by updating only a small subset of parameters instead of the entire model that reduces computational costs, memory usage, and training time while maintaining performance close to full fine-tuning. Adapter modules which insert small neural networks (e.g., feed-forward layers) between transformer layers (Houlsby et al., 2019), and Low-Rank Adaptation (LoRa), which introduces small, trainable low-rank matrices that approximate the weight updates needed for adaptation, drastically reducing memory and compute costs while maintaining performance, instead of fine-tuning all model weights, are common applications of Parameter-Efficient Fine-Tuning (Hu et al., 2022). Prefix-Tuning is another parameter-efficient fine-tuning method designed to optimize a small set of continuous task-specific vectors (called the prefix) added to the input sequence that reduces computational costs while maintaining performance, especially in low-data scenarios (Li & Liang , 2021).

In addition to above methods for increasing the efficiency of LLM training, some other data related methods have also been heavily studied. However, these studies include both training of LLMs by using these strategies and making LLMs generate data to use in other areas. These methods include among others Data Augmentation, Synthetic Data Generation, and Curriculum Learning.

Data Augmentation: refers to techniques, which are borrowed from traditional machine learning and NLP, but adapted to the context of LLMs, used to expand, diversify, or improve the training dataset to make the model more robust, accurate, or aligned without collecting entirely new data. Data augmentation is applied by using techniques like paraphrasing, back-translation, prompt variation and synonym replacement for producing new training data from existing data without changing its meaning (Xie et al., 2020).

Synthetic Data Generation: involves creating entirely new data from scratch whilst **Data Augmentation** Modifies existing data to create variants. Synthetic Data Generation has been increasingly used in LLM fine-tuning, especially in instruction-tuning, alignment, and domain adaptation phases. While traditional pretraining of LLMs mostly relies on massive real-world corpora (e.g., web text, books, Wikipedia), synthetic data now plays a critical role in making models more efficient. It has been proven that the fine-tuning an LLM with self-generated data could improve efficiency considerably (Wang et al., 2022).

Curriculum Learning: is a training strategy inspired by the way humans learn in which the LLM is trained by **starting with easier tasks or examples and gradually progressing to more difficult ones**. This is shown to improve the **convergence speed, final accuracy** and, to help the model **generalize better** by learning basic concepts before complex ones, especially for code language models (Nair et al., 2024).

4. TRENDS IN LLM TRAINING RESEARCH

The number of research papers on the methods and strategies which are given in Section 3 are retrieved from Google Scholar in order to comprehend the direction of the recent trends in increasing efficiency of LLM training. The search is conducted for different time intervals to capture short-term changes in advancements and make comparisons. First time interval was chosen as 2022-2025 (End of May) to reflect the recent research in these fields. For each area of research, the search string is formulated as “LLM” AND “the related research area” since only the research related to LLMs should be considered. Number of research in these fields in this interval are given in Figure 3. Research in Efficient Transformers, Mixture of Experts (MoE), and Knowledge Distillation are grouped together since these techniques aim to optimize the architecture of the LLMs itself, on the other hand, LoRA, QLoRA, Prefix-Tuning, and Adapter Modules are grouped as Parameter-Efficient Fine-Tuning and Data Augmentation, Synthetic Data Generation, and Curriculum Learning are grouped together as data related LLM training techniques.

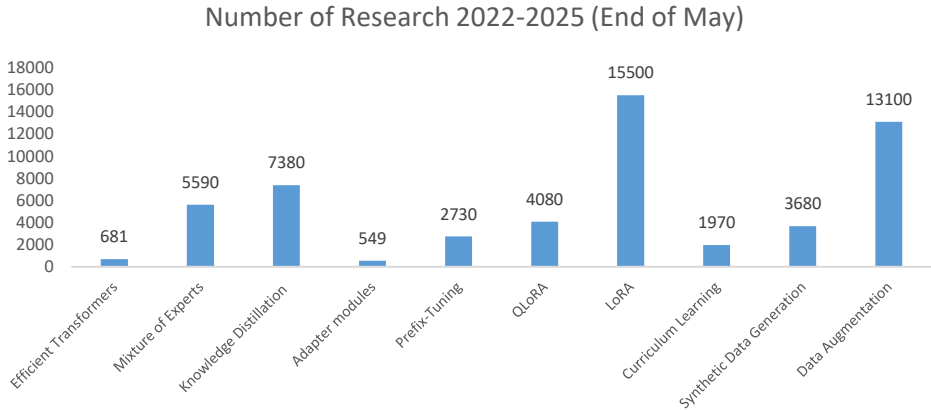


Figure 3 Research Numbers between 2022-2025 (End of May) in LLM Training

Number of research in three areas related to LLM training has been significantly increased in recent years, studies in fine-tuning getting the most attention from researchers. More than 17000 research papers have been published in the field of LoRA in the past four years. QLoRA has been an area where a lot of have been published. It should be noted that number of papers related to LoRA includes those of QLoRA to great extend since most of the research of QLoRA, the term LoRA is also mentioned. Data related LLM training techniques have also been immensely researched, Data Augmentation being the most studied area with more than 15000 publications. Synthetic Data Generation has been catching great attention from researchers too. Regarding the architecture of the LLMs, research has also been increasingly done in past 3-4 years.

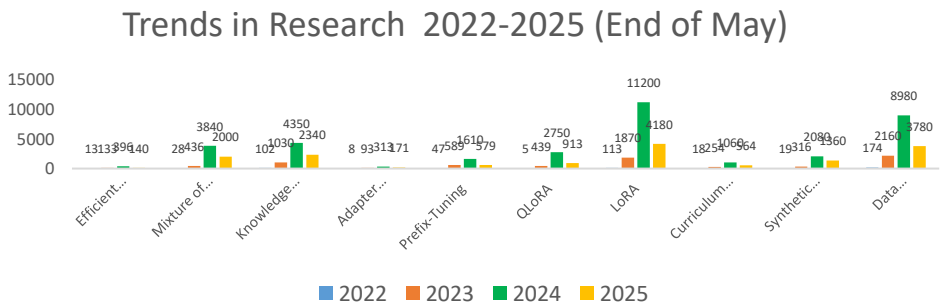


Figure 4 Trends in Research between 2022-2025 (End of May) in LLM Training

As to see if the trends in these research areas continue more recently as it has been in the past few years, yearly research numbers are shown in Figure 4. The data includes years 2022 through 2025 (including the 5 months of 2025 till end of May). As seen in Figure 4, research in Parameter-Efficient Fine-Tuning boomed in recent years and culminated in 2024. This trend seems to be slowing in 2025 but still with thousands of studies. In the other two research areas, namely data and architecture related, the upward trend seems to be continuing.

CONCLUSION

The introduction of the transformer architecture and hence the extraordinarily rapid developments in natural language processing in recent years have brought LLMs into the lives of almost every human being in the world. Chat applications based on LLMs with human-like responsiveness have become widespread and have made it clear that artificial intelligence will be one of the most important research topics of our century. However, in addition to the philosophical and ethical dimensions of this phenomenon, the cost dimension has also become one of the most important issues that need to be examined. The fact that the training of LLMs requires huge amounts of hardware, data, and human resources, and that these models can only be developed by institutions with very strong financial support that creates great disadvantages for those who cannot afford it, has become a topic of discussion.

The perception that the cost of LLM training has reached astronomical figures and creating more efficient LLMs can only be possible with more hardware, data and human resources has led to a rapid increase in research in this area. In this study, these research topics are analyzed under three main headings: research regarding the architecture of LLMs, Parameter-Efficient Fine-Tuning and data related research. First of all, the number of research studies in these three main areas has been increasing significantly in recent years. The numbers in some research areas increased from tens or hundreds in 2022 to over tens of thousands in 2024.

The reason for the relatively less work in the areas of Efficient Transformers, Mixture of Experts (MoE), and Knowledge Distillation, which are architecture related, compared to other topics is that these areas are directly based on LLM pretraining and therefore involve challenges intrinsic to the subject matter. On the other hand, much more research is conducted in Parameter-Efficient Fine-Tuning and data-related fields since they mostly cover application areas. It appears that most of the research is in the field of LoRA (including QLoRA) in 2024. Data Augmentation also emerges as another popular research topic. Although the research boom in Parameter-Efficient Fine-Tuning in 2024 seems to have slowed slightly in the first five months of 2025, the upward trend in other research areas seems to continue. Consequently, the effort to create less costly

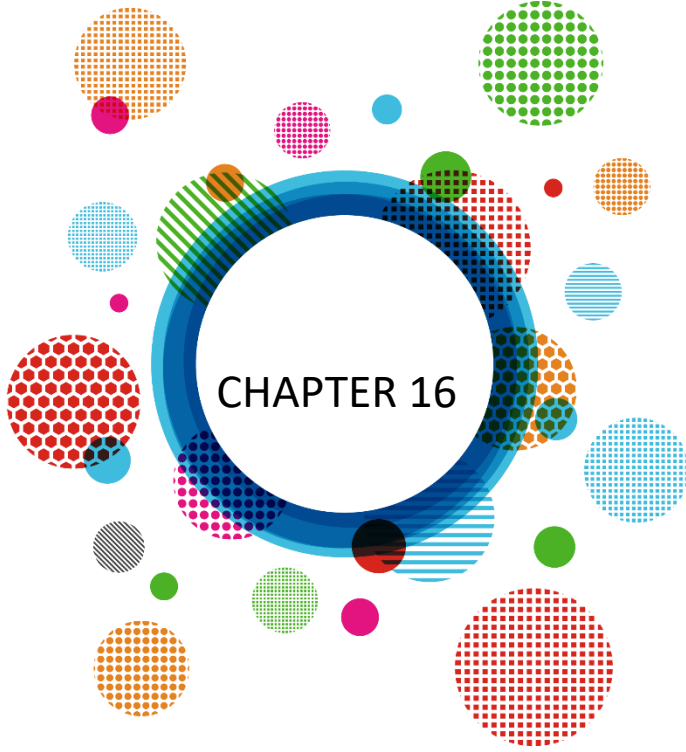
and more efficient LLMs will continue to be a hot topic in the scientific community in the coming years.

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Tourism Demand Forecasting in Türkiye: SARIMA and Artificial Neural Network Hybrid Model Approach^{*}

Kadriye Nurdanay Öztürk¹ & Serpil Türkyılmaz²

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¹ Res.Asst., Bilecik Şeyh Edebali University, Faculty of Sciences, Department of Statistics and Computer Sciences, Türkiye, ORCID: 0000-0003-4108-993X

² Prof. Dr., Bilecik Şeyh Edebali University, Faculty of Sciences, Department of Statistics and Computer Sciences, Türkiye ORCID: 0000-0002-7193-4148

1. INTRODUCTION

With its contributions to the global economy, the tourism sector has gained a critical place in the development strategies of many countries and has developed rapidly. In addition to financial gains, the industry has important benefits like fostering international contacts, encouraging cross-cultural dialogue, and assisting with environmental sustainability. Türkiye, with its rich cultural heritage and natural beauties, hosts millions of tourists every year and continues to contribute to its economy with the revenues it generates from tourism. The country's geographical location offers easy access to tourists from both Asia and Europe, making Türkiye an attractive destination. Thanks to its location advantage, Türkiye is among the developing countries where tourism stands out as a strong economic activity and attracts an increasing number of international visitors every year (Gaberli & Akdeniz, 2024).

In recent years, there has been a steady increase in the number of tourists coming to Türkiye and the tourism sector has become strategically important in terms of providing external financing for the national economy (Karagöz, 2008). This situation makes it important to accurately estimate the number of tourists in terms of economic policies as well as businesses in the tourism sector. While healthy forecasts of the number of tourists guide the future planning of businesses in the sector, they also allow public authorities to better evaluate the foreign exchange revenues to be obtained from tourism. However, in order for these forecasts to yield reliable and valid results, the methods used must be carefully selected. In particular, both linear and nonlinear methods are needed to effectively analyze features such as trends and seasonal variability in tourism demand.

Among the traditional linear models, ARIMA and SARIMA models that take seasonality into account are among the widely used methods in tourism forecasting. These models can effectively model trend and seasonal components and provide successful results in short-term forecasts even with limited data sets. However, nonlinear models such as ANNs offer a strong alternative to linear models thanks to their ability to learn complex relationships (Moeeni & Bonakdari, 2017). By combining the linear properties of SARIMA and the capacity of ANN to model nonlinear relationships, a SARIMA- ANN hybrid model is developed, which has the advantages of both methods. Studies on the effectiveness of hybrid models in time series forecasting have been increasing significantly. Not only in the field of tourism, but also in various other sectors, there are studies in which hybrid models yield successful results.

Díaz-Robles et al. (2008) used multiple linear regression, ARIMA, ANN models as well as a hybrid model combining ARIMA and ANN for air quality prediction. As a result of the analysis, the hybrid model was found to be more

successful in predicting air quality than the other three models. Shafaei et al. (2016) evaluated the effectiveness of wavelet, SARIMA, ANN and wavelet-SARIMA- ANN hybrid model for precipitation forecasting. As a result of the analysis with monthly data from Nahavand meteorological station in Iran, it was found that the wavelet-SARIMA- ANN model provided a higher accuracy in precipitation prediction compared to other models. Moeeni and Bonakdari (2017) applied the SARIMA-YSA hybrid model for monthly flow forecasts for the Jamishan dam reservoir in western Iran. The findings of the study revealed that the hybrid model predicted peak flood flows more accurately, but the SARIMA model performed better in baseflow forecasting. The results show that the hybrid model provides more reliable results by reducing prediction errors and is suitable for long-term use. Mukaram and Yusof (2017) used SARIMA, ANN and SARIMA- ANN hybrid model to forecast solar radiation data in Malaysia. The results of the study compared the performance of these three models through various metrics and revealed that the SARIMA- ANN hybrid model outperformed the other models in solar radiation forecasting. Alencar et al. (2018) proposed a SARIMA and neural network-based hybrid approach for multi-step wind speed forecasting. This hybrid method, tested with real meteorological data, provided higher accuracy in metrics such as MAE, MAPE and RMSE compared to traditional methods.

Yollanda and Devianto (2020) used SARIMA, ANN and SARIMA- ANN hybrid model to predict the number of tourists arriving at Minangkabau International Airport in their study covering the years 2012-2019 and the findings showed that the hybrid model performed well in predicting the number of tourists. Belmahdi et al. (2020) applied ANN, ARIMA and ARIMA- ANN hybrid model to predict daily global solar radiation for three different cities in Morocco. The hybrid model provided more accurate results in global solar radiation forecasting compared to single models. Soares et al. (2020) used a hybrid approach consisting of an ANN and SARIMA model to predict crime rates in Sao Paulo and to make the deployment of security forces more effective. The model produced results showing that it can be effective in reducing crime rates and in the correct allocation of police resources.

Nualtong et al. (2021) investigated SARIMA, ANN and SARIMA-ANN hybrid models to predict water levels in the Yom River basin. The findings revealed that SARIMA and SARIMA-ANN models outperformed ANN in the rainy season, while all models performed similarly in the dry season, with the SARIMA-ANN model performing best in data series with high fluctuations. Izudin et al. (2021) showed that the ARIMA- ANN hybrid model gives better results than ARIMA and ANN models in forecasting electricity consumption in Malaysia. Khan et al. (2021) compared ARIMA, ANN and ARIMA- ANN hybrid

models using Pakistan's gold price data for the period 2003-2021 and concluded that the hybrid model outperformed the other models. In order to forecast the inflation rate in five emerging economies in Latin America, Peirano et al. (2021) proposed a hybrid model combining SARIMA and LSTM models and showed that hybrid models have high accuracy in inflation forecasting. Nontapa et al. (2021) applied a hybrid forecasting model combining SARIMA and ANN to real data such as Thai electricity consumption and SET index, and showed that it provides higher accuracy than forecasting models used alone.

Fiskin et al. (2022) compared the model performances of SARIMAX, MLP, LSTM, NARX and SARIMAX- ANN hybrid models to forecast the domestic maritime transportation volume in Türkiye. The results show that SARIMAX- ANN and SARIMAX can produce more accurate results than the compared models, but their forecasting performance is not statistically significant. The SARIMAX-MLP model performed the best, outperforming SARIMAX and LSTM models. de Souza et al. (2022) used a hybrid model based on ARIMA and ANN for end-of-life vehicle forecasting in Brazil and found that the hybrid model outperformed the traditional ARIMA model. Hajirahimi and Khashei (2022) proposed a new parallel hybrid model using ARIMA and MLPNN to better model complex structures in time series. Tests with three datasets from international stock markets revealed that the proposed hybrid model outperformed the single and sequential hybrid models. In their study, Azad et al. (2022) used SARIMA and ANN hybrid model to predict the water level of Red Hills Reservoir due to climate change and complex physical processes and proved that the hybrid model outperforms the single models in terms of accuracy and provides a reliable option for reservoir management.

Alsawaylimi (2023) compared the time series forecasting performance of ARIMA, ANN and hybrid models using monthly gold prices. The results showed that hybrid models provide higher accuracy than ARIMA and ANN, while stand-alone models cannot capture all the patterns in the data. To model and predict the monthly electrical conductivity parameter of the Maroun River, Ahmadpour et al. (2023) used SARIMA, Holt-Winters models, ANN, seasonal time series hybrid models, Holt-Winter ANN and SARIMA-ANN hybrid models. The results of their study showed that the SARIMA-ANN hybrid model has higher accuracy than other models.

Polestico et al. (2024) conducted a comparative study of AR, SARIMA and SETAR models and their hybrids with ANN using Canadian lynx data. The results revealed that the SETAR- ANN model showed the best forecasting performance, but hybrid models did not always provide higher accuracy. The study showed that SETAR- ANN is more successful than other hybrid models, especially in short-term forecasting. Samal and Kumar (2024) proposed a hybrid

model combining ARIMA and ANN techniques to predict software failures and improve software reliability. Performance evaluations with real-world software data show that the model provides superior results compared to traditional prediction methods. Çağlayan-Akay and Topal (2024) compare the performance of single and hybrid models for forecasting Türkiye's electricity consumption. The results show that hybrid models provide higher forecasting accuracy than single models and among these models, the Khashei and Bijari model performs the best.

Ezugwu et al. (2025) used the Hybrid ARIMA-ANN Model to improve the accuracy of electrical load forecasting. The hybrid model was tested for different time periods (1 hour, 3 hours and 1 week ahead) and almost accurate results were obtained for all forecasts. The results show that the hybrid model significantly improves the accuracy. Vallejo et al. (2025) analyzed the air quality in the Quintero, Puchuncaví and Coyhaique regions of Chile between 2016 and 2021 with the Hybrid ARIMA-ANN model. The model showed high accuracy with R^2 values above 90% and MAPE values below 1%. Shakila and Sk (2025) evaluated the performance of ARIMA, ANN and ARIMA-ANN hybrid models using rice crop data from the Godavari basin in India and showed that the ARIMA-ANN hybrid model provided higher prediction accuracy than the stand-alone models.

Cappello et al. (2025) tested the hybrid ARIMA-ANN model performance on different financial data sets, including Unicredit SpA share price, Bitcoin closing price and EUR/USD exchange rate, and showed that the model gave better results compared to both ARIMA and ANN models alone. Abdulraheem et al. (2025) evaluated the accuracy of ARIMA, Support Vector Machine, Random Forest, ANN and ARIMA-ANN hybrid models for inflation forecasting in Nigeria using monthly inflation data for the period 2000-2024. The results show that the ARIMA-ANN hybrid model can better capture complex structures and provide high accuracy compared to other models.

In recent years, there has been a growing interest in hybrid modeling approaches that combine the strengths of traditional statistical methods and artificial intelligence-based methods. A review of the literature shows that hybrid models generally provide higher accuracy in the prediction of complex and dynamic processes compared to single methods. Accordingly, this study aims to contribute to more accurate and reliable forecasting of the future trends of the tourism sector, which is one of the main drivers of the Turkish economy, and to provide a new perspective to the forecasting studies based on the SARIMA- ANN hybrid model, which is limited in the literature. The study evaluates the performance of the hybrid model in forecasting the number of visitors to Türkiye and reveals the most appropriate forecasting method. The analysis proves the

potential of the hybrid model to improve the forecasting performance in line with the findings in the literature.

The contributions of the study to the literature are emphasized in three aspects: (i) to provide a comprehensive and up-to-date forecast analysis of Türkiye's tourism demand based on a dataset covering the period January 2012-June 2024, (ii) creating a hybrid model with SARIMA and ANN models and showing in detail how well it predicts tourism demand, and (iii) giving practitioners and decision-makers an insight backed by data to improve tourism planning and policy. In these respects, the study contributes to the theoretical literature and provides concrete recommendations for strategic decision makers and industry representatives.

The study plan is presented below: The Introduction section, where general information is provided, is followed by the Method section, where the time series approach employed in the study is introduced. The analysis results and interpretations of the study are presented in the Analysis section, and a general evaluation of the results is given in the Conclusion and Recommendations section. The final part of the study, References, contains a list of the studies benefited from.

2. METHOD

This section provides brief theoretical information about the methods used in the study.

2.1. ARIMA and SARIMA Model

The ARIMA (Autoregressive Integrated Moving Average) model developed by Box and Jenkins (1970) is a univariate time series model used for forecasting. Autoregressive terms in these models describe the dependence between lagged values of the dependent variable, while moving average terms describe the dependence of error terms on prior error terms. It is mainly applied to model variables where the mean, variance and error terms are stationary.

The ARIMA model is represented by the Autoregressive (AR) component, the degree of integration and the Moving Average (MA) part, represented by p , d and q respectively. The general form of an ARMA(p , q) model is expressed as in Equation (1):

$$Y_t = \phi_0 + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \dots + \phi_p Y_{t-p} + \varepsilon_t - \theta_1 \varepsilon_{t-1} - \dots - \theta_q \varepsilon_{t-q} \quad (1)$$

ARMA (1,1) model;

$$Y_t - \phi_0 - \phi_1 Y_{t-1} = \varepsilon_t - \theta_1 \varepsilon_{t-1} \quad (2)$$

or,

$$Y_t = \phi_0 + \phi_1 Y_{t-1} - \varepsilon_t + \theta_1 \varepsilon_{t-1} \quad (3)$$

is expressed as.

In practice, financial time series are often non-stationary due to factors such as trend, seasonal, cyclical fluctuations and random fluctuations. If the observation values of a time series are not stationary around the mean of the series, stationarity is ensured by taking the appropriate degree of differences of the series. d indicates the degree of difference (integration). Accordingly, the general expression of the ARIMA (p, d, q) model is shown in Equation (4) if d differencing is performed (Szostek et al., 2024, Alrweili and Fawzy, 2022):

∇ = difference operator is, $Z_t = \nabla Y_t = Y_t - Y_{t-1}$ if; $\nabla_t^d = (1 - L)^d Y_t$ is expressed as.

$$Z_t = \phi_0 + \phi_1 Z_{t-1} + \phi_2 Z_{t-2} + \dots + \phi_p Z_{t-p} + \varepsilon_t - \theta_1 \varepsilon_{t-1} - \dots - \theta_q \varepsilon_{t-q} \quad (4)$$

ARIMA (1,1,1) model;

$$Z_t = \phi_0 + \phi_1 Z_{t-1} + \varepsilon_t - \theta_1 \varepsilon_{t-1} \quad (5)$$

is shown. The Lag operator is expressed as in Equation (6):

$$(1 - \phi_1 L)Z_t = (1 - \theta_1 L)\varepsilon_t \quad (6)$$

Seasonality is one of the components that disturb the stationarity of time series. In order to ensure the stationarity of the series, it is necessary to take a seasonal difference to remove the seasonal effect. SARIMA models are widely used for linear and seasonal time series forecasting. The general expression of the SARIMA (p, d, q)(P, D, Q)_s model for the time series Y_t , where s denotes the seasonal period, is shown in Equation (7) (Özmen ve Şanlı, 2017):

$$\phi(L)(1 - L)^d \Phi(L^s)(1 - L^s)^D Y_t = c + \theta_1(L)\theta(L)\varepsilon_t \quad (7)$$

Here;

$$\begin{aligned} \phi(L) &= 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p \\ \Phi(L^s) &= 1 - \Phi_1 L - \Phi_2 L^2 - \dots - \Phi_p L^p \\ \theta(L) &= 1 - \theta_1 L - \theta_2 L^2 - \dots - \theta_p L^p \\ \Theta(L^s) &= 1 - \theta_1 L^s - \theta_2 L^{2s} - \dots - \theta_p L^p \end{aligned}$$

is expressed as.

$\phi(L)$; non-seasonal autoregressive AR(p) operator, $\Phi(L^s)$; seasonal autoregressive SAR(P) operator, $\theta(L)$; non-seasonal moving average MA(q) operator, $\Theta(L^s)$; seasonal moving average SMA(Q) operator.

2.2. Artificial Neural Network (ANN) Model

The foundations of artificial neural networks were laid in the 1940s with efforts to mimic the structure of the human brain. The first artificial neural network model was developed in 1943 by Warren McCulloch, a neurologist, and Walter Pitts, a mathematician, in an article titled “A Logical Calculus of Ideas

Immanent in Nervous Activity”. ANNs are synthetic structures that mimic biological neural networks (Öztürk, 2018). Artificial neural networks began to attract renewed interest in the 1980s. Kohonen's self-organizing maps (1982) and Hopfield's dynamic network models pioneered this process. In 1986, the “backpropagation algorithm” developed by Rumelhart, Hinton, and Williams enabled the training of multi-layer networks, marking an important turning point. Artificial neural networks (ANNs), which can be thought of as computer models or mathematical algorithms developed based on biological neural networks (the brain), are fundamentally based on the idea of how the brain can be simulated using computers. In this sense, ANNs have attracted significant interest in many fields, including medicine, biology, psychology, computer science, mathematics, economics, and statistics. The primary reason for this interest is that ANNs are a versatile, flexible, non-linear tool that performs well in approximating any arbitrary function (Ruiz et al., 2016; Alrweili, 2022). In this study, the non-linear autoregressive network (NAR) model is applied to predict single-variable time series data. The NAR network provides predictions using both individual and hybrid methods.

Generally, time series applications are characterized by high variations and temporary periods, which makes it difficult to model time series using a linear model. Therefore, the nonlinear autoregressive neural network (NAR) applied to time series forecasting defines a discrete, nonlinear, autoregressive model that can be written as follows.

$$y(t) = h(y(t-1), y(t-2), \dots, y(t-p)) + \varepsilon(t) \quad (8)$$

Equation (8) explains how an NAR network uses the p past values of the series to predict the value of the data series y at time t , $y(t)$. The $h()$ function is unknown beforehand, and the training of the neural network aims to approximate the function through the optimization of network weights and neuron biases. Finally, the term $\varepsilon(t)$ represents the error of the approximate value of the series y at time t . This formula explains how a NAR network is used to predict the value of the data series y at time t , $y(t)$, using the p previous values of the series (Ruiz et al., 2016; Alrweili, 2022).

In this study, the NAR neural network is used to model the tourist number time series as follows: the network structure includes an input ($y(t-12)$ corresponding to the tourist number at time $t-12$) and an output (the next value of the time series to be predicted, $y(t)$).

2.3. Hybrid Model

Additive Hybrid Model: Time series may contain linear and nonlinear components. For this reason, hybrid approaches can provide better results for

time series forecasting by using linear and nonlinear models together. The general approach in ARIMA- ANN hybrid models in the literature is as follows: An ARIMA model is estimated for the relevant time series. The error terms of the most appropriate ARIMA model are obtained and considered as the nonlinear part and this nonlinear part is modeled with different Artificial Neural Network (ANN) models. In the additive hybrid model proposed in Zhang (2003), the time series y_t is expressed as the sum of linear and nonlinear components as in Equation (8) (Alsuwaylimi, 2023; Erturan and Merdivenci, 2022; Alrweili and Fawzy, 2022).

$$y_t = L_t + N_t \quad (9)$$

In the model expressed in Equation (8), the ARIMA model is used for the linear part of the time series y_t denoted by L_t and the predictions obtained for $\hat{L}_t$ are shown as in model Equation (10):

$$\hat{L}_t = c + \sum_{i=1}^p \varphi_i y'_i + \sum_{j=1}^q \theta_j \varepsilon_{t-j} \quad (10)$$

In Zhang (2003), the prediction values of the ARIMA model in (10) are subtracted from the time series y_t and the focus is on this difference series or error series for nonlinear changes in the series.

$$N_t = y_t - \hat{L}_t \quad (11)$$

N_t error series $\hat{N}_t$ prediction values obtained by ANN approach;

$$\hat{N}_t = f(n_1, n_{t-1}, \dots, n_{t-n}) + v_t \quad (12)$$

Where $\hat{N}_t$ is the predicted nonlinear error series, f is the nonlinear function and v_t is the white noise component of the ANN model.

According to Zhang (2003), aggregate hybrid model forecasts are obtained as the sum of ARIMA model forecasts and ANN model forecasts.

$$\hat{y}_t = \hat{L}_t + \hat{N}_t \quad (13)$$

A summary of the ARIMA- ANN additive hybrid model is shown in Figure 1.

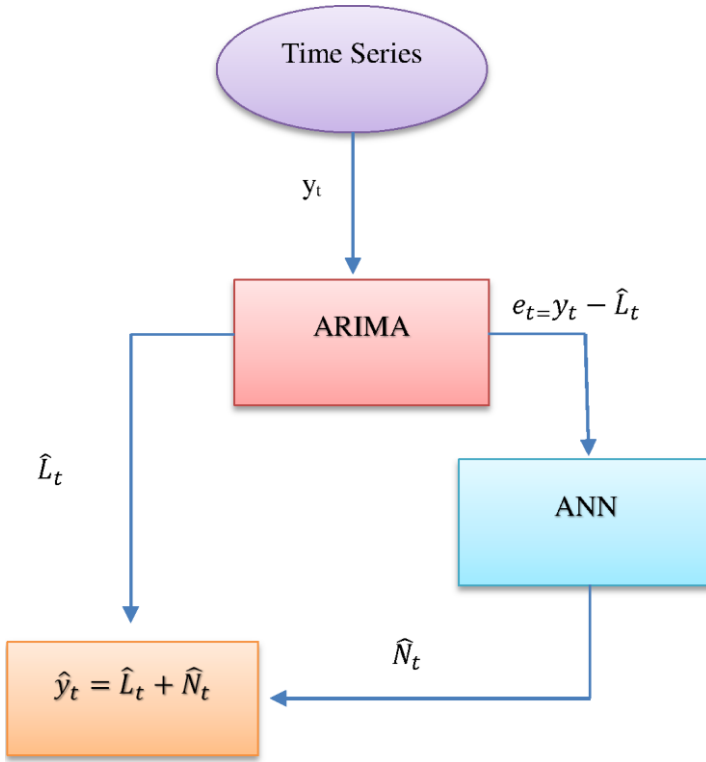


Figure 1. ARIMA-ANN Hybrid Model

2.4. Model Evaluation Criteria

The error metrics used to evaluate the model performances in the selection of the most appropriate model in the study are given below:

Mean Squared Error (MSE)

$$MSE = \frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2 \quad (14)$$

Root Mean Squared Error (RMSE)

$$RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2} \quad (15)$$

Mean Absolute Error (MAE)

$$MAE = \sum_{i=1}^n \frac{|y_i - \hat{y}_i|}{n} \quad (16)$$

Mean Absolute Percentage Error (MAPE)

$$MAPE = \frac{1}{n} \sum_{i=1}^n \frac{|y_i - \hat{y}_i|}{y_i} \times 100, \quad y_i \neq 0 \tag{17}$$

3. ANALYSIS

3.1. Data

The data set used in the study is the number of tourist arrivals to Türkiye on a monthly basis between 2012 and 2024 from Turkish Statistical Institute (TUIK) data portal (<https://data.tuik.gov.tr/>). The (TS) graph for the study series consisting of a total of 150 observations is given in Figure 2 and descriptive statistics are given in Table 1.

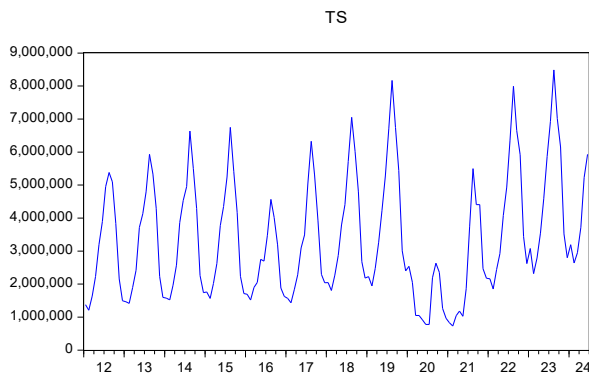


Figure 2. Time Series Graph of Monthly Tourist Numbers (TS)

According to the series graph given in Figure 2, it is seen that the number of tourists arriving in Türkiye on a monthly basis between 2012 and 2024 exhibits seasonality. As of the end of 2019 and mid-2021, the series exhibits a similar trend except for the decline during the Covid-19 pandemic period.

Table 1. Descriptive Statistics

Variable	TS
Mean	3374851
Median	2835425
Max.	8488026
Min.	727125
Std.Dev.	1812367
Skewness	0.684
Kurtosis	2.617
Jarque-Bera	12.613 (0.002)

In Figure 3, when the ACF and PACF functions of the series are analyzed, it is seen that the series exhibits seasonality.

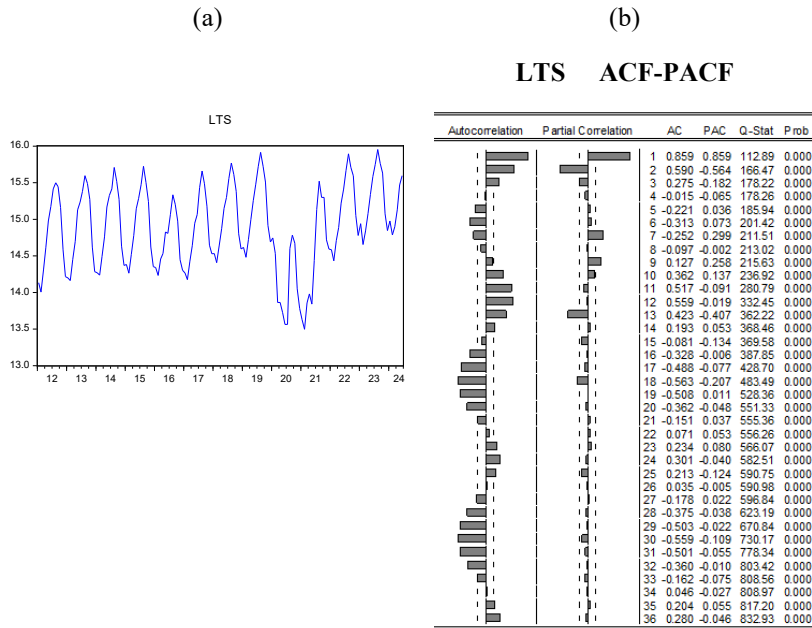


Figure 3. Logarithmic Tourism (LTS) Series (a) and ACF-PACF Plot (b)

Figure 4 shows the graph of the LTS series (SLTS) with 12 seasonal differences.

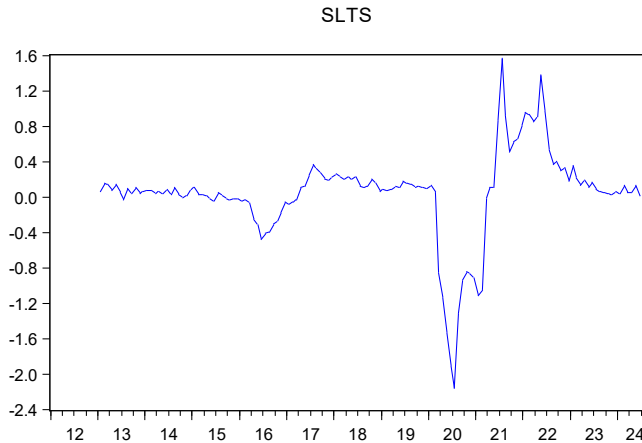


Figure 4. Seasonally Differenced (SLTS) Series Graph

Table 2 presents the Unit Root Test Results for the LST and SLTS series.

Table 2. Unit Root Test Results

Variable	ADF	PP	KPSS
LTS	-3.307117(0.0164)**	-4.254455(0.0008)**	0.116206**
Canova Hansen (CH) Seasonal Unit Root Test Results			
Joint LM Statistics	$L_f=3,000279$		(%5) Kritik Değer 2.750**
Variable	ADF	PP	KPSS
SLST	-3.189662(0.0016)**	-2.844269(0.0047)**	0.088869**

** , 5% indicates statistical significance, *Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) 5% critical value (0.463000).

The Canova-Hansen (CH) seasonal unit root test is based on the null hypothesis of “stationarity at seasonal frequencies”. In the CH test, the null hypothesis of seasonal stationarity at all frequencies is tested with a joint test, while stationarity can also be tested separately for each frequency. The presence of a seasonal unit root indicates that seasonality is stochastic. In the analysis of such series, it is more appropriate to take the seasonal difference instead of using seasonal dummy variables or seasonal dummy variables. Table 2 presents the findings of the L_f statistic for the Canova-Hansen (CH) seasonal unit root test, which is widely used in the literature and can be applied to monthly data.

Accordingly, since $L_f=3.000279$ is greater than the critical value of 2.750 at 5% significance level, the null hypothesis “ H_0 : No Seasonal Unit Root” is rejected. It is seen that seasonality has a stochastic structure. For this reason, the results of the ADF, PP and KPSS unit root tests applied to the seasonally de-seasonalized series by taking 12 seasonal differences of the series are shown in Table 2. According to the findings, the series is stationary.

3.2. SARIMA Model

Table 2 shows that the SLTS series is stationary. For the stationary SLTS series, seasonal ARIMA models were estimated at different lags P and Q and the model comparison results according to AIC (Akaike information criterion), Schwarz information criterion (SIC), Hannan-Quinn information criterion (HQ) are given in Table 3.

Table 3. SARIMA Model Results

Model	R ²	AIC	SIC	HQ
SARIMA(1,0,1)(1,1,0) ₁₂	0,882	-0,5770	-0,4925	-0,5429
SARIMA(1,0,1)(0,1,1)₁₂	0,912	-0,7852	-0,7004	-0,7508
SARIMA(1,0,0)(0,1,1) ₁₂	0,906	-0,7287	-0,6651	-0,7029
SARIMA(2,0,0)(0,1,1) ₁₂	0,777	0,1227	0,1863	0,1486
SARIMA(3,0,0)(0,1,1) ₁₂	0,662	0,5208	0,5840	0,5466
SARIMA(0,0,3)(0,1,1) ₁₂	0,611	0,7066	0,7703	0,7324
SARIMA(2,0,2)(0,1,1) ₁₂	0,786	0,1154	0,2003	0,1499
SARIMA(3,0,3)(0,1,1) ₁₂	0,667	0,5258	0,6107	0,5603
SARIMA(3,0,3)(1,1,0) ₁₂	0,567	0,7176	0,8024	0,7521
SARIMA(2,0,1)(1,1,0) ₁₂	0,873	-0,5000	-0,4152	-0,4656

According to the model selection criteria in Table 3, the most appropriate model SARIMA(1,0,1)(0,1,1)₁₂ is selected.

General expression of the model:

$$\varphi(B)\nabla_{12}^1 y_t = \Theta_1(B^{12})\theta(B)\varepsilon_t \quad (18)$$

$$(1 - \varphi_1 B)(1 - B^{12})y_t = (1 + \theta_1 B^{12})(1 + \theta_1 B)\varepsilon_t \quad (19)$$

$$y_t = \varphi_1 y_{t-1} + y_{t-12} - \varphi_1 y_{t-13} + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_1 \varepsilon_{t-12} + \Theta_1 \theta_1 \varepsilon_{t-13} \quad (20)$$

can be written as. The model estimation results are given in Table 4.

Table 4. SARIMA(1,0,1)(0,1,1)₁₂ Model Results

Variable	Coeff.	Std. Error	p-Val.
AR(1)	0,901614	0,021992	0,0000**
MA(1)	0,270026	0,066590	0,0001**
SMA(12)	-0,852587	0,074588	0,0000**

** denotes 5% statistical significance.

The prediction values of the number of tourists with the SARIMA (1,0,1)(0,1,1)₁₂ model are given in Table 5.

Table 5. SARIMA(1,0,1)(0,1,1)₁₂ Model Results

Date	TS-Predicted	TS-Actual
2023M06	5266807	5869766
2023M07	7429484	6926346
2023M08	9045256	8488026
2023M09	7031830	7013861
2023M10	5670898	6151397
2023M11	3369848	3520467
2023M12	2719623	2800281
2024M01	2728917	3194819
2024M02	2716789	2640392
2024M03	2941994	2949590
2024M04	3419674	3720878
2024M05	4502524	5224931
2024M06	6156515	5929709

3.3. ANN Model

Nonlinear autoregressive models (NAR) use different past period values to predict future period values. The NAR neural network, which has a very good fitting ability for a nonlinear time series and consists of three layers (Input, Hidden and Output), is used in this study for the forecasting of the number of tourists. In the model, lagged monthly tourist numbers are entered into the model as input variables and the NAR network is created with MATLAB program ntstool module. 80% of the data was introduced to the network for training, 10% for validation and 10% for testing and the training algorithm was Levenberg-Marquardt. The NAR(1:10:1) model was estimated for 12 lagged monthly tourist numbers with 1 Input layer, a hidden layer with 10 neurons and 1 Output layer consisting of current tourist numbers.

Figure 5 shows the ANN-NAR network structure for monthly tourist numbers.

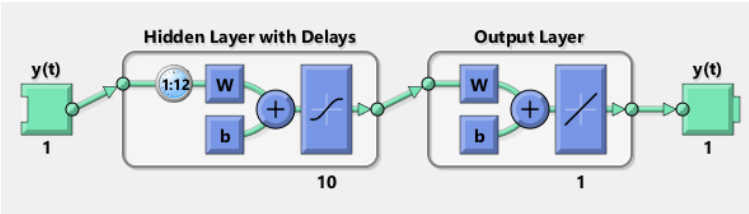


Figure 5. NAR Neural Network Model Structure

Table 6. ANN Model Results

Date	TS-Predicted	TS-Actual
2023M06	6032057,47	5869766
2023M07	5817315,463	6926346
2023M08	6452369,996	8488026
2023M09	6272140,737	7013861
2023M10	4741767,491	6151397
2023M11	3094400,367	3520467
2023M12	2785457,317	2800281
2024M01	2281031,148	3194819
2024M02	1910906,16	2640392
2024M03	2489668,187	2949590
2024M04	1688795,663	3720878
2024M05	2513810,138	5224931
2024M06	2893252,893	5929709

3.4. SARIMA-ANN Hybrid Model

In the SARIMA- ANN hybrid model estimation, the error terms of the most appropriate SARIMA (1,0,1)(0,1,1)₁₂ model estimated for monthly tourist numbers are used as input for the 3-layer ANN-NAR model. In this hybrid model, the number of delays is 12 and the number of hidden layer neurons is 10. The network structure of the model is similarly given in Figure 6.

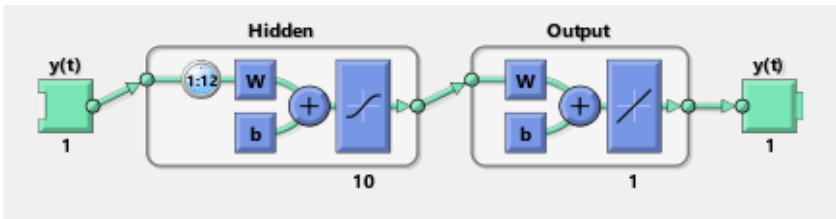


Figure 6. ANN-NAR Neural Network Model Structure

The SARIMA- ANN hybrid model estimates are the error term estimates of the SARIMA (1,0,1)(0,1,1)₁₂ model used as input. Therefore, according to the aggregate hybrid model approach of Zhang (2003) given in Equation (8), the number of tourists forecasts are obtained by summing the SARIMA- ANN hybrid model forecasts and SARIMA (1,0,1)(0,1,1)₁₂ model forecasts. The prediction values of the number of tourists according to the SARIMA- ANN Hybrid Model are given in Table 7.

Table 7. SARIMA-YSA Hybrid Model Results

Date	TS-Predicted	TS-Actual
2023M06	5266807,057	5869766
2023M07	7429483,910	6926346
2023M08	9045256,035	8488026
2023M09	7031829,660	7013861
2023M10	5670897,687	6151397
2023M11	3369848,500	3520467
2023M12	2719622,700	2800281
2024M01	2728916,900	3194819
2024M02	2716789,272	2640392
2024M03	2941993,611	2949590

2024M04	3419673,715	3720878
2024M05	4502524,290	5224931
2024M06	6156514,692	5929709

3.5. Performance Metrics for Models

Indicators for performance comparisons of the models used in the study are given in Table 8.

Table 8. Performance Metrics

MODEL	MSE	RMSE	MAE	MAPE
SARIMA	2614950851917,44	1617080,9664	1508036,8349	35,9388
YSA	15896642791671,60	3987059,4166	3656609,2149	85,0792
SARIMA-YSA	150094859075,05	387420,7778	303848,6522	7,0860

According to the MSE, RMSE, MAE and MAPE criteria obtained for the prediction performance of the SARIMA model, ANN model and SARIMA- ANN Hybrid model estimated for the study data in Table 8, it is possible to say that the hybrid model has considerably lower error values than other models and captures the structure of the tourist numbers series better than other models. The comparison of the prediction values of the SARIMA- ANN hybrid model with the actual values is shown in Figure 7.



Figure 7. Actual –Predictive Values of SARIMA- ANN Hybrid Model

Figure 7 shows the compatibility between the actual values of tourist arrivals to Türkiye and the forecast values of the SARIMA-ANN hybrid model.

4. CONCLUSIONS AND RECOMMENDATIONS

In this study, a hybrid model for time series forecasting is proposed by considering the number of tourist arrivals to Türkiye at monthly frequency for the period 2012-2024 and the forecasting performances of SARIMA, ANN model and SARIMA- ANN hybrid model are compared. It is observed that the SARIMA- ANN hybrid model, which is based on the additive hybrid model approach developed by Zhang (2003), outperforms the other models in terms of error metrics.

The findings reveal that the hybrid model is able to capture the structural features of the tourist numbers over time more successfully and therefore provides more reliable results in the future forecasting of tourism demand. In the literature, some studies on tourism support the superior performance of hybrid models compared to single models (Nor et al., 2018; Saba et al., 2022; Kayral et al., 2023).

These results suggest that hybrid modeling approaches can be used as an effective tool in strategic decision-making processes and forward-looking planning in the tourism sector. Moreover, the study provides a basis for future research in this field. In particular, comparing the performance of different hybrid approaches such as the multiplicative hybrid model, the hybrid model proposed by Khashei and Bijari (2010), as well as new modeling approaches that will be created by integrating machine learning and deep learning-based models is among the aspects of the study that can be expanded. Thus, it will be possible to develop models that are more flexible, adaptive and able to deal with complex data structures.

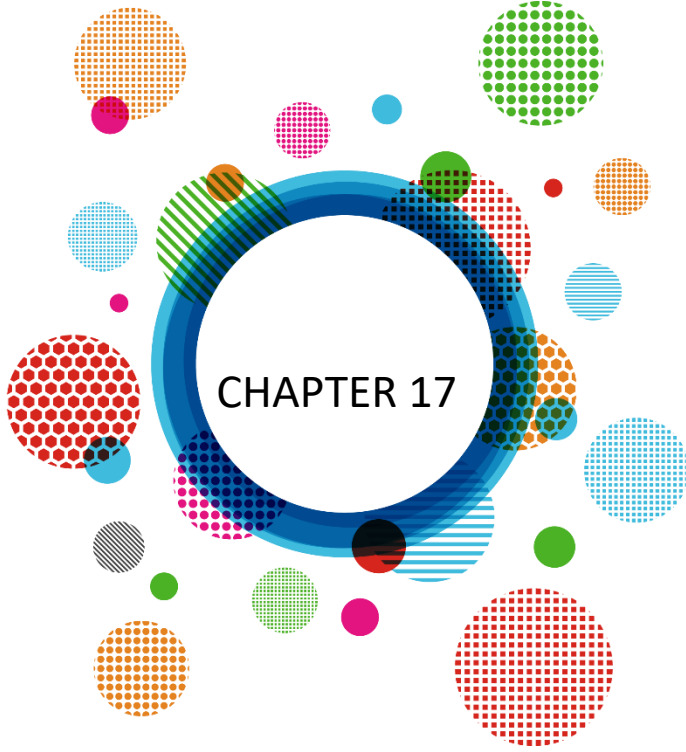
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The Big Society Project: Challenges and Opportunities for Citizens

Muhterem Merve Altıntaş¹

¹ Öğr. Gör. Dr. Ankara Yıldırım Beyazıt Üniversitesi, ORCID: 0000-0002-5528-5539

1. Introduction

Contemporary economic challenges in many parts of the world have compelled states to seek new solutions. In such an attempt, David Cameron introduced the *Big Society* project as a response to the difficulties in delivering public services, which highly influenced his UK Conservative Party's 2010 General Election manifesto. The Big Society was positioned as a central policy agenda aimed at rethinking the role of the state in welfare provision. While the project appears coherent on paper, it was debated widely by scholars focusing on issues such as welfare service delivery, the deeper objectives of the project, its connection to broader socio-economic crises, and its impacts on both service quality and key institutions such as the third and private sectors.

This chapter focuses on the Big Society project as it was introduced and implemented during the early 2010s, under the UK's Conservative–Liberal Democrat coalition government. It examines the policy's key propositions, its ideological foundations and contradictions, and the debates it sparked within academic and policy-making circles.

With an interdisciplinary approach, the chapter brings together political theory, economic strategy, and sociological interpretation. Politically, it engages with the contradictions between traditional conservative values and the communitarian rhetoric of the Big Society. Economically, it explores how the project aligned with a broader strategy of austerity and public spending cuts. Sociologically, it discusses the implications for civic participation and equality, as well as the role of the voluntary and private sectors in service provision.

While empirical data have further clarified the actual outcomes of the Big Society project, this study remains a valuable snapshot of how the initiatives were interpreted and theorised during its formation period. It captures intellectual and policy-oriented responses, and provides readers with an understanding of how ambitious state reform projects are received in the early period of their implementations.

This chapter first introduces the concept of the Big Society. It then provides prominent arguments on the possible political and ideological motivations behind Cameron's advocacy for it. Finally, it discusses whether the Big Society offers considerable advantages for the citizens or introduces new problems and risks.

1. Contextual Background

When the coalition government—composed of the Conservative Party and the Liberal Democrats—came to power in 2010, the UK economy was facing

significant challenges. For some, there was a recession in the country with a deep uncertainty. A major public sector deficit, reflecting a gap between income and expenditure, was a widely discussed issue, with four identified causes behind: increased spending on banking bailouts, reliance on short-term borrowing to avoid undermining demand, reduced tax receipts during the downturn, and the government's reluctance to raise taxes ahead of an election (Taylor-Gooby & Stoker, 2011).

These economic difficulties were not unique to the UK. As such, many other Western countries were having cuts in their public expenditures. According to IMF data, EU member states and the USA initiated cuts to public expenditures in 2009, and the UK followed in 2010 - coinciding with the formation of the new government and Cameron's rise to office.

2. Cameron's Vision

Within this context, the new government framed the financial crisis as a consequence of an overly powerful state, as well as an economic problem, as explained in greater detail in the following sections. Cameron aimed at lessening the apparent burden on the state. He argued that the previous Labour government had failed by allowing the state to become too powerful and led to a large government debt (see Kisby, 2010). To him, the "big state" was an outdated model of governance, and that governments must adopt new roles today. With this belief, Cameron launched the Big Society project - described by him as a personal passion – on which both leaders in the coalition agreed.

Fundamentally, the Big Society aimed to reduce the role of the state and promote greater citizen involvement, encouraging people to take charge of and be responsible for their own well-being (Such, 2012). One of the key documents presenting and promoting this vision to the public was the *Giving Green Paper* (2010), published by the Cabinet Office. It presented the project as a shift toward a society where people are 'in more control, supported to pursue their collective and individual goals, and less reliant upon the state' (p.4). In this way, it was given as an attempt to redistribute power and create opportunity to people, while encouraging social action and volunteering. The paper emphasized "a massive transfer of power from Whitehall to local communities" (p.16).

3. The Shift in Responsibility

Charities, community groups, and social enterprises were placed at the heart of the Big Society agenda. These actors were framed as primary agents in ensuring the welfare of citizens, while the state's role was redefined as supportive

rather than central. As stated in the *Giving Green Paper* (2010), the government committed to providing ‘concrete support, both financial and non-financial,’ to such organisations (p. 7). In other words, the state would no longer act as the main provider of services. Instead, the primary responsibility was put on local, community-based solutions. North (2011:819) captures this reorientation by noting that ‘the role of public policy is not to meet needs itself through public sector provision, but to develop citizens’ capabilities to meet their needs themselves through their own, autonomous organisations’.

The initiative was launched with pilot programmes in selected “vanguard communities,” including Liverpool, Windsor and Maidenhead, Sutton, and Eden Valley in Cumbria (Alcock, 2010). Human factor was central to this vision: individuals were asked to contribute to their communities unless prevented by serious constraints. These were presented as early examples of how community-led governance and service provision could function in practice.

On paper, the Big Society concept appears reasonable: the state reduces its overwhelming expenditures while people take greater responsibility for addressing their local needs, often through local institutions such as community groups and voluntary organizations. There are certain benefits of local governance. Decentralization makes it possible to save time when delivering public services, makes it easier to identify local public needs, and allows for the willingness and capacity of philanthropy—which cannot be ignored. Additionally, the third sector might be most effective in this context.

However, the literature finds both the intentions and consequences of the Big Society project significantly diverge from these idealized benefits. The following section explores these complexities in greater detail.

4. Contradictions, Critiques, and Consequences

4.i: Ideological Contradictions and Political Motivations

The Big Society project reveals notable ideological tensions when situated within traditional conservatism. Classic conservative thought often rests on a pessimistic view of human nature, seeing individuals as self-interested actors, not hesitating to compete with each other. Accordingly, people best understand what they need, which should ideally be met by market mechanisms rather than state mechanisms. This said, critiques find Cameron’s and his project’s appeal to altruism and community spirit contradictory (see Kisby, 2000).

Hence, some argue that hidden reasons and aims exist beyond the visible ones. The financial crisis at the time seems to be a significant factor behind the project.

North (2011: 819) asks ‘can the Big Society be disconnected from the claimed need to radically reduce the UK’s deficit in order to avoid financial crises?’. This explanation resonates with the common practice of governments under economic strain, aiming to transfer state functions to local communities as a cost-saving measure.

As mentioned above, the UK has experienced major cuts in public spending since 2010. Given how unpopular this reality is for the public, Cameron’s government needed a plausible justification for these austerity measures. As such, North (2011) interprets the Big Society as ‘Thatcherism with a community face’ with its efforts to withdraw the support of the state from the needy (p.819); while Kisby (2010), takes the projects as a strategic rhetorical device to mask deep public spending cuts. Such (2012) further emphasizes the umbrella aim of passing responsibility and power from the state to citizens.

The transfer of responsibility also allows politicians to avoid accountability for certain service failures. In doing so, the government minimizes its risk exposure. Furthermore, in such a context where economic hardship is evident across the UK and much of the Europe, one would anticipate citizens to have reduced access to welfare state benefits. Setting the expectations that individuals should meet their own needs thus helps deflect criticisms over decreased state support.

4.ii: Impacts on Public Services and the Third Sector

The transfer of responsibility from the central government to local actors and non-state sectors, as aimed in the Big Society project, raises important questions about the quality and sustainability of public services. While localism and citizen empowerment are presented as democratic ideals, practical concerns arise when essential services such as health, education, and housing are no longer guaranteed or coordinated by the state.

One of the key issues is the dependency of the voluntary sector on state funding. As Taylor-Gooby and Stoker (2011) rightly discuss, ‘the voluntary sector and especially the large provider agencies within the sector are heavily dependent on grants from local government and other state sources, *currently subject to cuts*’ (p.10) (emphasize added). Without adequate financial support, the third sector struggles to maintain capacity, coverage, and professionalism. Alcock (2010: 385) adds that as market pricing mechanisms increasingly dominate, smaller and less commercially viable organisations face exclusion. In such a context, private sector actors — with greater resources and institutional experience — become the dominant service providers, not local communities or

non-profit organizations. This means the services once provided by the state or volunteers would be handled by profit-making businesses. Such a shift leads to arguments that the Big Society paves the way for large-scale privatization.

Summarized by North (2011), ‘in this case, the winners will be the wide range of private companies that routinely bid for public sector contracts’ (p.283). The dominance of profit-driven service delivery undermines the project’s original moral claims. What began as a discourse of citizen empowerment may, in practice, facilitate the expansion of private capital into welfare provision.

As an important public sector service with both its mission and functions, healthcare exemplifies this transformation. The National Health Service (NHS) White Paper proposed transferring a significant portion of budgetary responsibility to consortia of general practitioners (GPs), who would commission services from a range of competing providers (see Taylor- Gooby and Stoker, 201:9). This reform signals a deeper structural shift toward a situation in which state-guaranteed care is gradually replaced by a market of independent providers. This move may well be interpreted as a step toward privatisation.

Coming to the questions of effectiveness, i.e. whether Cameron’s idea of the Big Society really worked, critiques argue it is unrealistic to expect voluntary organizations and private companies to take over the services the government stopped providing. This is the case especially when these actors lack the structural support or financial stability to do so effectively. As Alcock puts, ‘the Big Society may be Cameron’s great passion, but it is a political slogan (...) rather than an analytical concept (p.386). Thus, while the rhetoric promotes empowerment, the actual outcome may be unequal, fragmented and diminished quality services.

4.iii: Policy Implications: Participation, Equality and Inclusion

Public spending cuts tend to affect the most vulnerable groups in society the most. This is simply because these groups rely more heavily on public services and support systems to maintain a basic standard of living than others. Kisby (2010) warns that unless the state actively helps with fair distribution of resources, these disadvantaged groups will face more hardship under the Big Society project.

Taylor-Gooby and Stoker (2011) argue that the Coalition’s cuts in benefits and services hit women and children hardest, especially those with low incomes. They refer to a study by the Women’s Budget Group, which assumed the service cuts to the income of lone parents – 90 per cent of whom are women – by 18.5 per cent within 5 years. Moreover, poor single pensioners, also mostly women, were estimated to face a 12 per cent cut.

Besides, given that there are many women working in public sector jobs, a reduction or outsource in public services would put them in risk of losing their jobs and further spread poverty among the disadvantaged. This makes the project not only a challenge for service users but also for those who rely on public employment.

Housing is another sector where people feel the effects of the Big Society, affecting their level of welfare. Spendings on social-housing were cut in half, with rents expected to increase from 20–40 per cent of market levels to 80 per cent, in an effort to attract private providers (Taylor-Gooby & Stoker, 2011). Being a struggle for many already, the changes in housing conditions are likely to deepen problems existent in broad segments of the society.

One remaining dimension of the Big Society debate is whether the public is truly willing to participate as the project assumes. Civic engagement is key to the project's success. As such, Such (2012) takes the Big Society as a “leisure policy”, suggesting that the government is attempting to guide how people spend their free time, while encouraging them to use it to help the communities they are part of. While the plan assumes that the public's willingness give from their time, effort and even financial resources would replace a “broken” society (such as the British society) with a restructured one, empirical studies suggest otherwise (see Granovetter 1973; Putnam 2001). If participation is insufficient, the model risks delivering lower-quality public services—or, in some areas, no service at all.

This issue raises concerns about equality. To begin with, private sector actors, with their significantly more resources, tend to place voluntary organisations at a disadvantage, which is incompatible with the latter's central role in the Big Society vision. Second, the local delivery of services risks widening **regional inequalities**, with well-resourced areas being more likely to succeed and deprived communities finding themselves in a struggle. Third, social inequalities deepen when vulnerable groups experience disproportionate negative impacts from reduced public provision, examples of which has been explained previously.

While decentralisation – as shifting responsibilities from the central government to local actors - can carry certain benefits, when it comes to vital needs — especially those previously met by centralised public services — such as healthcare, education and social care, it can lead to unequal access in different areas, resulting in deeply problematic outcomes. In the absence of strong coordinating role from the state, differences across communities become inevitable. In a situation where the government largely avoids responsibility for

monitoring and correcting these disparities and provides limited initial support, inequalities persist.

Last, but not least, there is an inconsistency in the government's emphasis on certain actors—namely, charities and social enterprises—while neglecting others. As such, Alcock (2010: 386) points out ‘there is always somebody missed off the list – where are the mutuals or community groups?’ However, the project openly aims to build a truly unified civic structure. This narrow framing of the ‘third sector’ undermines inclusivity and ultimately works against the goals of the Big Society.

5. Conclusion

The Big Society was introduced by David Cameron as the solution to the perceived failures of previous governments, with criticism aimed at the size and reach of the state and a desire to reduce it. The project aimed to reshape the relationship between the individual, the community, and the state by encouraging civic responsibility while reducing government involvement in service provision.

This vision, however, required a major transformation in the structure and culture of British society. While Cameron’s ambition and enthusiasm were clear, the assumption that such deep-rooted issues could be addressed with minimal state intervention was seen by many as overly optimistic. Relying merely on the voluntary and private sectors to take on roles traditionally held by the state raised certain practical and ethical concerns.

One major issue was that these sectors did not have the same resources or ability to handle such a responsibility: The private sector often had more resources and competitive advantages, while voluntary organisations remained heavily dependent on state funding. At the same time, putting a greater burden on the vulnerable segments, widespread cuts to public spending led to deeper inequalities among the society. Women, children, and low-income communities were particularly exposed to the negative consequences of reduced public support.

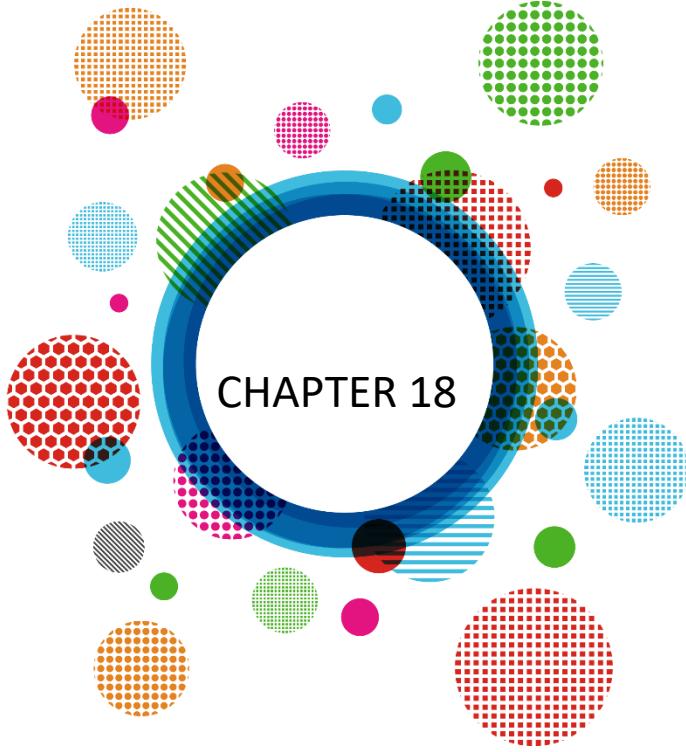
Furthermore, high levels of public participation were required for the success of the Big Society. On the other hand, it could not be guaranteed. In opposition to the government’s assumptions, research and real-world developments suggested that participation was limited and uneven.

The aforementioned issues bring suspicion about the deeper motives behind the project. While it was framed as a move toward greater unity and empowerment, many interpreted it as a step toward privatisation and a withdrawal

of state responsibility. In the end, the Big Society struggled to deliver on its ambitious promises. Introducing such a major ideological and policy shift in such a time of economic austerity without well-prepared structural support proved problematic. Rather than offering effective solutions, the project led to salient questions about replacing the role of the state with the society.

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Unlocking Potential: The Dynamic Link Between Talent Development and Organizational Learning and Development (OLD)

Ramazan Özkan Yıldız¹

Introduction

This book chapter tries to explore the complex relationship between talent development and organisational learning and development (OLD). This chapter aims to utilise key concepts from the literature on organisational learning, knowledge management, and leadership to offer insights on how organisations may utilise talent development programmes to strengthen their learning culture and promote sustainable growth. The chapter will examine theoretical frameworks, conceptual interpretations, and practical consequences to provide a thorough comprehension of how talent development may be strategically harmonised with organisational learning and development (OLD) to unlock the full potential of the organisation.

Organisational learning and development (OLD) encompass the methods by which organisations get, maintain, and utilise knowledge to improve performance, adjust to changes, and accomplish strategic goals. The notion of a learning organisation highlights the importance of establishing a culture that fosters continuous learning at all levels within the organisation. This strategy entails cultivating a mentality that appreciates the generation, dissemination, and utilisation of knowledge to enhance the efficiency of an organisation. Organisational learning and development are essential for organisational success and sustainability. By promoting a culture of learning, embracing reflective practices, and leveraging knowledge management strategies, organisations can adapt to change, drive innovation, and effectively achieve their strategic goals. (Örtenblad, 2018).

Talent development is the process of creating, choosing, and implementing development strategies that are in line with the HR processes of an organisation. The firm ensures that its employees possess the necessary skills and knowledge to achieve its strategic goals. The main objective of talent development is to foster individual growth through appropriate organisational support. The achievement of successful talent development is the outcome of a continuous organisational endeavour in talent management, complemented by other talent management activities and practices that are deeply ingrained in its fundamental structure. Talent development encompasses creating opportunities for individuals to enhance their skills, knowledge, and capabilities to achieve personal growth and contribute effectively to organisational goals (Yildiz and Esmer, 2023).

In the current dynamic business environment, organisations are increasingly acknowledging the vital significance of talent development and OLD (Coetzer et al., 2022). Talent development is centred on fostering employee skills and competences, whereas OLD prioritises establishing a culture of ongoing learning and innovation within an organisation (Gravan et al., 2002). This chapter seeks to investigate the interconnected relationship between these two ideas and

illustrate how organisations might gain advantages by synchronising their talent development plans with their OLD efforts.

The theory of organisational learning offers a strong basis for comprehending how organisations obtain, interpret, and utilise information to enhance their performance (Jabar et al., 2011). Organisations may cultivate a culture that promotes learning and fosters the generation of innovative ideas and behaviours by incorporating concepts such as intuition, epistemology, and knowledge management. Talent development is essential in this process since it provides employees with the necessary skills and knowledge to properly contribute to the organisation's learning culture (Fang and Chen, 2016).

The relationship between organisational learning and talent development is mutually beneficial. Organisational learning establishes the basis for ongoing enhancement and adjustment, while talent development guarantees that individuals possess the essential abilities and expertise to make valuable contributions to the organisation. Organisations may foster a culture of growth, innovation, and sustainable success by integrating talent development strategies with organisational learning initiatives.

The correlation between organisational learning and development (OLD) and talent development is crucial for the long-term expansion and achievement of organisations. OLD encompasses the process of obtaining, comprehending, and using information inside a company to enhance performance and adjust to alterations. Talent development, in contrast, centres on fostering the abilities, aptitudes, and untapped potential of individuals within the organisation to improve their performance and make valuable contributions to organisational objectives.

Kontoghiorghes (2015) highlights that a strong OLD that promotes high performance is crucial for attracting and maintaining talented individuals. This process cultivates dedication and drive among employees, which are crucial for the effective implementation of talent development efforts. In addition, the significance of learning and development programmes, coaching, and job rotations in achieving sustainable organisational performance is emphasised in talent management practices (Aina and Atan, 2020). Organisations may bolster their learning culture and foster ongoing growth by allocating resources to talent development. In addition, research conducted by Pillai (2019) and Mayfield et al. (2016) emphasises the influence of talent management on organisational learning. The utilisation of talent analytics, the implementation of strategic human resource management, and the execution of talent development programmes all contribute to the establishment of a highly efficient workforce, ultimately leading to improved organisational development. Furthermore, a study conducted by Khaki et al. (2017) indicates that organisational learning serves as a mediator between

talent management systems and innovative behaviour, highlighting the interdependence of both notions.

In the near future, it will not be wrong to expect that the combination of talent development and organisational learning and development (OLD) will become even more important as organisations navigate a more intricate and competitive business environment. By connecting their people development strategies with their existing efforts, organisations may cultivate a culture that prioritises learning, innovation, and ongoing enhancement. This chapter provides guidelines for organisations seeking to improve their learning skills through talent development programmes and emphasises the need for additional study in this significant field.

To summarise, this chapter emphasises the significance of the dynamic connection between talent development and organisational learning and development (OLD) in propelling the success of an organisation. By integrating these two notions, organisations may establish a culture that prioritises learning, innovation, and ongoing enhancement, ultimately unleashing their complete capacity. Using theoretical insights, and conceptual examples, this chapter provides a thorough comprehension of how to strategically incorporate talent development with OLD to stimulate sustainable growth and gain a competitive edge.

Conceptual Background

Talent Development (TD)

Talent development is a deliberate and planned process in businesses that focuses on discovering and fostering individuals who possess the required skills and abilities to occupy crucial roles (Collings and Mellahi, 2009). It encompasses a range of actions and tactics aimed at improving employee performance and equipping workers for future positions and duties within the organization (Pandita and Ray, 2018). Structured learning experiences, such as workshops, seminars, online courses, and on-the-job training, are essential for developing specific skills or knowledge in particular areas. In addition, offering employees mentorship and coaching programs, where they receive direction and support from seasoned colleagues or external coaches, facilitates their professional and personal development. Talent development plans refer to a set of measures that include training, development, and career progression activities. These measures aim to promote the growth and retention of highly talented personnel (Yildiz and Esmer, 2023). Organizations can align their talent management procedures with strategic objectives by prioritizing the planning, selection, and implementation of development programs for their whole talent pool (Yildiz et al., 2023).

Ensuring clear pathways for career progression and providing individuals with the requisite abilities for leadership roles are also crucial aspects of talent development. This entails recognizing and nurturing individuals with exceptional potential for future positions through the use of career pathing and succession planning strategies (Barkhuizen and Masale, 2022). Regularly assessing and providing feedback on employee performance is essential for acknowledging strengths and identifying areas that require growth. This process entails establishing objectives, carrying out performance evaluations, and executing strategies for professional development. The primary objective of this approach is to enhance proficiency in both technical and interpersonal abilities, encompassing effective communication, effective leadership, adept problem-solving, and adaptability (Kafetzopoulos and Gotzamani, 2022).

Establishing an organizational culture that highly values ongoing learning and enhancement is essential for fostering talent development. This culture is nurtured by encouraging employees to engage in additional education, certifications, and professional development opportunities. Various activities, like recognition programs, career development opportunities, and fostering a happy work atmosphere, can enhance employee engagement and retention. Talent development that is effective has a favourable influence on organizational goals such as productivity, work satisfaction, and reduced absenteeism (Luna-Arocas and Morley, 2015). It ensures that workers are sufficiently prepared for future opportunities within the company and plays a crucial role in attracting, nurturing, and retaining skilled employees (Frank et al., 2004). Companies can improve job happiness, motivation, commitment, and trust in leadership by implementing these programs (Bethke-Langenegger et al., 2011). Talent development is crucial for firms to maintain competitiveness, adjust to market changes, and retain high-performing individuals, all while supporting their career aspirations (Mehdiabadi and Li, 2016).

Organizational Learning and Development (OLD)

The holistic strategy of Organizational Learning and Development (OLD) aims to enhance the knowledge, talents, and competencies of a company's employees. The study by Pereira et al. (2021) emphasizes the importance of both individual and collective learning processes in order to enhance overall performance and attain strategic objectives. Corporate Learning and Development (OLD) is a complex process that involves multiple linked parts, including acquiring and sharing information, implementing new knowledge, making sense of information, retaining knowledge, critical thinking, unlearning outdated practices, utilizing intelligence, improvising, and managing emotions. The corporate culture influences all these elements (Akgün et al., 2003). Developing a learning culture that fosters continual education, information

sharing, and innovation is crucial. This involves promoting principles and behaviors that facilitate ongoing skill development and knowledge acquisition. The mutual interactions of these processes lead to organizational learning and development (OLD), highlighting the importance of social cognition in understanding OLD (Kucharska and Rebelo, 2022).

Incorporating organized training and development programs is another essential component of OLD. The company customizes its programs, including workshops, seminars, online courses, and on-the-job training, to meet the unique needs of both the firm and its personnel (Macik-Frey et al., 2007). Furthermore, it is imperative to use efficient knowledge management strategies to acquire, retain, and distribute corporate information. This guarantees that valuable knowledge and expertise are easily available to all employees, promoting teamwork and well-informed decision-making (Wang et al., 2011). Performance management is a crucial aspect of organizational leadership and development (OLD), as it involves the frequent evaluation and assessment of employee performance. This procedure facilitates the identification of strengths and areas that need improvement. It entails establishing explicit performance objectives, carrying out evaluations, and devising customized growth strategies (Dahling et al., 2010). Leadership development is a crucial aspect that emphasizes the identification and cultivation of potential leaders within the business. Establishing a strong pool of skilled leaders for future positions is the goal (Williams et al., 2019).

Facilitating personnel and organization adjustment to changes in the business environment is another critical element of OLD. Implementing efficient change management strategies aids in effectively preparing for and handling changes, thereby reducing disturbances and upholding productivity (Liu and Wei, 2022). Several initiatives to enhance employee engagement contribute to organizational loyalty and dedication, as engaged individuals tend to be more motivated, content, and devoted to the organization (Benn et al., 2015). In summary, OLD (organizational learning and development) is crucial for firms to maintain their competitiveness and adaptability in response to market fluctuations. Organizations can improve performance, stimulate creativity, and achieve long-term success by investing in their personnel's ongoing growth and advancement.

The Dynamic Link between TD and OLD

The complex interplay between talent development and organizational learning and development (OLD) is crucial in influencing efficient business management practices. Talent development is to improve the abilities and competencies of employees, ensuring that their career advancement is in line with the organization's strategic goals (Yildiz et al., 2023). This alignment guarantees that employees possess the essential skills and abilities required to make a

meaningful contribution towards achieving organizational objectives. It promotes the development of a highly skilled workforce that is capable of generating innovation and sustaining a competitive edge (Osolase, 2023).

Knowledge management, which includes the processes of acquiring, sharing, and using knowledge inside an organization, creates a supportive environment for talent development. OLD ensures that talent development programs are in line with strategic objectives by fostering a learning culture that emphasizes continual education, knowledge exchange, and adaptation. The components of OLD, such as sensemaking, organizational memory, and intelligence, empower people to interpret and utilize their abilities in a manner that fosters corporate achievement. This establishes a positive feedback loop: as employees enhance their skills and knowledge, they contribute to a more extensive repository of organizational information, which in turn fosters both individual and collective learning and development (Akgün et al., 2003).

The amalgamation of talent development and organizational learning and development (OLD) has a significant influence on business management. It enhances decision-making processes by utilizing a wide range of insights and experience, leading to more knowledgeable and effective conclusions. Furthermore, this collaboration improves the ability of organizations to quickly adapt to changes in the market, foster innovation, and take advantage of new prospects. This agility is especially vital in businesses marked by swift technical breakthroughs and changing consumer demands.

In addition, OLD is strongly associated with talent management, promoting a culture of ongoing learning and enhancement. Organizational learning mediates the relationship between talent management and innovative behaviour among employees (Khaki et al., 2017). Integrating talent management with OLD allows firms to strengthen the skills and capabilities of their workers, resulting in enhanced organizational effectiveness (Golubovskaya et al., 2019).

The talent management system unites TD and OLD in harmony to facilitate nurturing and developing top talent to help organizations achieve their business objectives and gain a competitive edge. Studies have shown that talent management practices have a beneficial effect on different human resource outcomes, including job satisfaction, motivation, commitment, and trust in leaders (Bethke-Langenegger et al., 2011). Organizations that give high importance to talent management practices can decrease recruitment expenses, allow efficient knowledge transfer, achieve corporate plans, provide innovative services and products, and establish a competitive edge (Harsch and Festing, 2020). Talent management involves more than just matching workers with suitable employment; it also involves enhancing their abilities to achieve company objectives (Thunnissen et al., 2013). Talent management encompasses

the processes of attracting, recognizing, developing, and retaining individuals with high potential who bring value to the firm (Yildiz and Esmer, 2023). People widely recognize this as crucial for gaining a competitive edge and achieving corporate success (Schliemann, 2014).

Overall, the interconnected relationship between talent development and organizational learning and development (OLD) is crucial for efficient corporate administration. Organizations that allocate resources to developing their employees' talents, ensure that their workforce's abilities are in line with their long-term goals, and incorporate talent management into their overall strategy are more likely to achieve lasting growth, gain a competitive edge, and enhance organizational efficiency. This integration not only improves decision-making and flexibility, but it also promotes a more involved and motivated staff, thereby aiding in the achievement of strategic company goals.

Conclusion

The intricate relationship between talent development and organizational learning and development (OLD) is crucial for the long-term growth and success of contemporary firms. By may cultivate a culture of continuous improvement, adaptability, and innovation by carefully connecting people development programs with established frameworks. This chapter has explained the underlying principles and real-world consequences of combining talent development with OLD, highlighting how this approach may unleash the complete capabilities of a business.

Talent development is essential for OLD, as it ensures that employees have the required skills and abilities to make valuable contributions towards achieving organizational objectives. By implementing well-designed training programs, providing mentorship, and offering career development opportunities, firms may foster a highly proficient staff that is capable of spearheading innovation and sustaining a competitive edge. OLD, in essence, establishes the structure in which talent development can flourish. OLD ensures that talent development programs are in line with the organization's strategic objectives by fostering a learning culture that emphasizes knowledge exchange, continual education, and adaptability.

The relationship between talent development and organizational learning and development (OLD) improves decision-making processes by utilizing a wide array of perspectives and specialized knowledge, resulting in more knowledgeable and efficient decisions. Additionally, it enhances the ability of organizations to quickly adapt to market fluctuations, foster innovation, and take advantage of emerging prospects. This kind of agility is especially vital in

businesses defined by swift technical breakthroughs and fluctuating consumer demands.

Furthermore, the amalgamation of talent development and organizational learning and development (OLD) cultivates a workforce that is more actively involved and driven. Employees who engage in ongoing learning and professional growth are more inclined to perceive their worth and dedication to their firm, resulting in increased levels of job satisfaction and employee retention. As a result, this reduces employee turnover expenses and contributes to the retention of a reliable and knowledgeable team, which is critical for achieving sustained economic prosperity.

Essentially, the mutually beneficial connection between nurturing talent and fostering organizational learning and growth plays a crucial role in enhancing organizational performance and competitiveness. By synchronizing the enhancement of individual skills with the broader objectives of organizational learning, firms may cultivate a workforce that is adaptable, creative, and highly effective. This integration not only improves the decision-making process and ability to adapt quickly, but it also helps to create a workforce that is more involved and motivated, ultimately assisting in the achievement of strategic business goals. This chapter offers a thorough comprehension of how to strategically integrate talent development with organizational learning and development (OLD) to generate long-lasting growth and achieve a competitive advantage in the ever-changing business environment of today.

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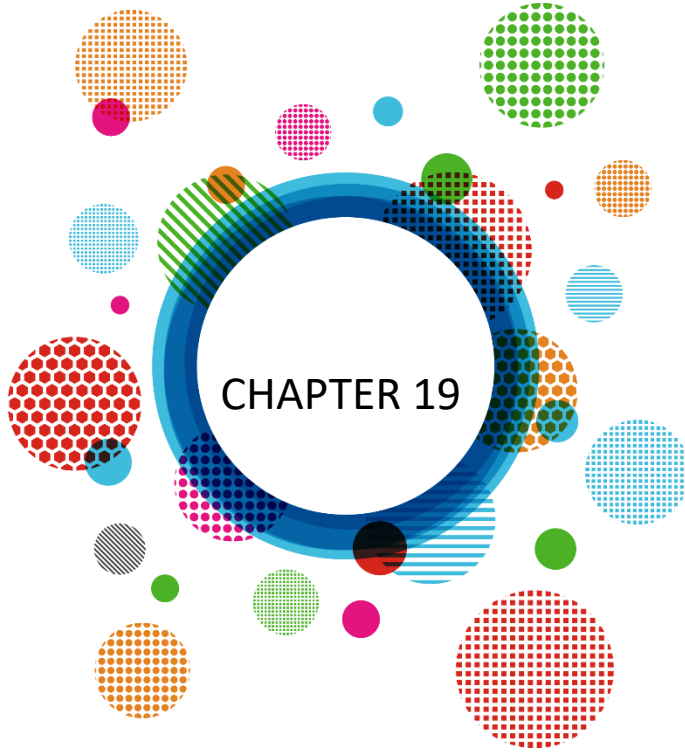
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Urbanization and Environmental Policies Within the Scope of Sustainable Development: A Case Study of Turkey

Gokhan Onder Erguven¹ & Bahar Ikizoglu²

¹ Assoc. Prof. Dr., Munzur University, Faculty of Faculty of Economics And Administrative Sciences, Department of Urbanization and Environmental Issues, Tunceli, Turkey, ORCID: 0000-0003-1573-080X

² Assist. Prof. Dr., Suleyman Demirel University, Faculty of Engineering and Natural Sciences, Department of Environmental Engineering, Isparta, Turkey, ORCID: 0000-0002-6654-7303

1. Introduction

One of the most critical policy challenges confronting governments worldwide particularly in low-income nations is the formulation and implementation of strategies that promote environmental sustainability (Dutta & Hazarika, 2023). As these countries pursue economic advancement, public policy must increasingly aim to harmonize development goals with ecological conservation efforts.

The global recognition of sustainable development has elevated environmental degradation to a key issue within the realm of public governance (Borghesi et al., 2015). Although natural systems possess a degree of resilience, ongoing human-induced pressures are diminishing their ability to recover and sustain ecological functions (Amel et al., 2017). From a policy perspective, this necessitates the urgent adoption of robust environmental governance frameworks and regulatory interventions designed to ensure long-term sustainability (Balsalobre-Lorente et al., 2018).

Sustainable development, in a policy context, refers to a developmental paradigm that satisfies present societal needs while safeguarding the ability of future generations to meet theirs (Holden et al., 2014). Effective public policy in this domain must address environmental, economic, social, and institutional dimensions in an integrated manner. The aim is not only to preserve environmental integrity but also to promote intergenerational and intragenerational equity through sound policy instruments and institutional capacity (Messerli et al., 2019).

The United Nations' Sustainable Development Goals (SDGs) agenda calls upon all countries irrespective of their economic status to adopt proactive policy frameworks aimed at fostering socioeconomic progress while simultaneously safeguarding environmental integrity (Ahmet et al., 2022). The SDG framework outlines 17 comprehensive goals designed to provide a strategic direction for integrating environmentally sustainable practices into both economic and social development initiatives (Ashurov et al., 2021). Significantly, both developed and developing nations have committed to these goals by pledging “nationally determined contributions,” thereby acknowledging their collective responsibility in promoting a more ecologically conscious model of development (Bulavskaya & Reynès, 2018). Nonetheless, less developed nations frequently encounter systemic policy and capacity-related barriers that hinder full compliance with SDG-related obligations (Kartal et al., 2022).

Efforts to address environmental challenges both globally and within Turkey do not have a long institutional or policy history. Historically, imbalances in the human–nature relationship only gained international prominence after the

Industrial Revolution, and particularly after capitalism began subordinating all forms of value to market logic. This shift intensified the urgency of environmental issues and necessitated the emergence of organized responses and policy interventions. It wasn't until the mid- to late-19th century that meaningful attempts to institutionalize environmental protection and formulate coherent policy strategies began to materialize (Keles, 2023).

In recent years, both public policymakers and private sector leaders have increasingly emphasized sustainability as a core component of governance and corporate strategy. However, research suggests that the effectiveness of green initiatives remains limited in the absence of substantial behavioral transformation among stakeholders (Goodarzi et al., 2021). Without corresponding shifts in individual and collective behavior, sustainability policies risk becoming symbolic rather than transformative. Therefore, contemporary environmental governance must prioritize not only the structural design of sustainability policies but also the psychological and experiential factors that influence public engagement.

One promising avenue in this regard is the integration of gamification into sustainability strategies. Empirical studies have demonstrated that gamified elements can enhance user participation and perceived relevance, thus increasing the likelihood of pro-environmental behaviors becoming habitual (Huotari & Hamari, 2012). Public policies that incorporate gamification mechanisms such as rewards, progress tracking, and social comparison—can effectively mobilize community-level participation and generate more resilient environmental outcomes.

Sustainable development, by definition, presents a multidimensional policy framework encompassing economic growth, social equity, and environmental protection. Within this triad, the environmental dimension has emerged as increasingly urgent and politically salient. This is particularly evident in the Turkish context, where national development goals must be aligned with robust environmental policy interventions to address escalating ecological threats. In this regard, analyzing the interaction between pro-environmental policy instruments and the broader sustainable development agenda in Turkey is critical for understanding the country's path toward ecological resilience.

Globally, the window of opportunity to limit global warming to 1.5°C a key threshold for avoiding the most severe impacts of climate change is rapidly closing (Matthews & Wynes, 2022). CO₂ emissions are escalating at a rate unseen in nearly two million years, posing significant challenges for energy policy and environmental justice. Projections indicate that, under current policy trajectories, low-carbon and renewable energy sources will constitute only a marginal share of the global energy mix by 2030. As a result, large segments of the global

population are expected to remain energy-insecure, relying on carbon-intensive and polluting fuels to meet basic needs.

In parallel, environmental degradation continues to threaten vital ecosystems and public health. Biodiversity loss, habitat destruction, and deforestation are proceeding at alarming rates. According to recent UN reports, reversing deforestation alone may require sustained and coordinated efforts over the next 25 years (United Nations, 2024). In light of these realities, environmental policymaking must adopt a long-term, systemic, and inclusive approach grounded in behavioral insights, technological innovation, and global cooperation to ensure that both present and future generations can thrive. Environmental policies (EP) have the potential to influence environmental quality, contingent upon their design and enforcement. From one perspective, well-structured or stringent EP can facilitate the reduction of reliance on traditional polluting fuels, enhance energy efficiency, encourage the uptake of sustainable energy sources, and alleviate the negative environmental consequences associated with economic growth (Danish et al., 2020). Conversely, a second perspective suggests that inadequately formulated or lenient EP may exacerbate environmental degradation by prompting pollution-heavy industries to relocate to nations with less rigorous standards, resulting in the transference of pollution (Ahmad et al., 2024). Finally, the specific makeup of EP encompassing both command-and-control regulations (CCR) and market-based mechanisms (MBR) may yield varying outcomes on sustainable development, depending on which regulatory approach prevails and the influence of other institutional factors (Bozatli and Akca, 2024).

1.1. The Interconnection Between Green Growth and Sustainable Development: A Policy-Oriented Perspective

Green growth has increasingly been recognized as a strategic approach to advancing the United Nations' Sustainable Development Goals (SDGs) as articulated in the 2030 Agenda. The United Nations Conference on Sustainable Development (Rio+20) in 2012 explicitly positioned green growth as a central mechanism for achieving the SDGs, emphasizing its integrative capacity to reconcile economic, social, and environmental dimensions (United Nations, 2012). This alignment stems from the fact that the core components of green growth resource efficiency, environmental integrity, and inclusive economic progress are inherently embedded within the SDG framework.

Although the concept has gained traction in policy discourse, its empirical assessment has been subject to variation, primarily due to the use of disparate metrics and frameworks across studies. The introduction of the Green Growth Index (GGI) in 2019 marked a significant advancement in this field by offering a more standardized and multidimensional tool for evaluating countries' progress

toward green growth (Acosta et al., 2019). The GGI captures key dimensions such as sustainable resource use, social inclusion, green economic opportunities, and environmental protection, making it an effective instrument for guiding national and international policymaking.

Effective implementation of green growth strategies, however, is contingent upon several foundational prerequisites. These include sustained investment in green technologies, the development and diffusion of environmentally friendly innovations, and the presence of robust, transparent, and capable institutions. Moreover, the success of green growth initiatives depends heavily on the formulation and enforcement of long-term, coherent policy frameworks that are aligned with national development priorities and environmental objectives (Ali et al., 2021).

From a public policy standpoint, the green growth paradigm offers a critical opportunity for governments to align economic development trajectories with ecological boundaries. As nations strive to meet their SDG commitments, integrating green growth principles into economic planning, regulatory frameworks, and fiscal policy becomes imperative not only for enhancing environmental outcomes but also for ensuring long-term social and economic resilience.

1.2. Low-Carbon Energy Sources and the Sustainable Development Nexus

The intensification of global environmental challenges ranging from high levels of pollution and the rapid depletion of natural resources to the escalating impacts of climate change has brought the sustainability of current development models into question. These issues, primarily driven by conventional economic activity, have underscored the urgent need for a systemic transformation of the global energy infrastructure. In this context, the transition toward low-carbon energy sources is not only a climate imperative but also a central component of the broader sustainable development agenda.

The adoption of clean and sustainable energy is explicitly highlighted in both the Paris Agreement and the United Nations 2030 Agenda for Sustainable Development, particularly under SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). Low-carbon energy is recognized as a critical enabler in reaching net-zero emissions, while also contributing to other interconnected goals such as inclusive economic growth (SDG 8), improved health outcomes (SDG 3), job creation, energy security, and social equity. Empirical studies conducted across various regions—including Europe, African countries, and the international sphere consistently emphasize the multidimensional benefits of clean energy adoption (Zahraoui et al., 2021).

Among the prominent low-carbon energy sources are renewable energies (such as solar, wind, hydro, and biomass) and nuclear power, both of which offer viable alternatives to fossil fuels. While renewables are increasingly cost-competitive and decentralized, nuclear energy continues to play a complementary role in providing baseload power with minimal carbon emissions. Together, these sources form the technological backbone of a sustainable and resilient energy system.

From a public policy perspective, the transition to low-carbon energy requires comprehensive and long-term strategies. This includes investment in infrastructure, innovation in energy storage and grid integration, reform of subsidies favoring fossil fuels, and regulatory frameworks that facilitate market entry for clean energy providers. Institutional capacity, governance quality, and international cooperation are also pivotal in ensuring that energy transitions are inclusive, just, and aligned with national development priorities.

In sum, low-carbon energy lies at the core of the sustainable development nexus. Its successful deployment represents not only a solution to environmental degradation but also a transformative pathway for building resilient economies and equitable societies.

Turkey has made significant progress in incorporating renewable energy into its national energy strategy, particularly through the expansion of wind and solar power. As of 2024, approximately 55% of Turkey's installed electricity capacity comes from renewable sources, including hydroelectric, wind, solar, and geothermal energy. This shift is driven by several policy instruments and institutional reforms aimed at meeting both energy security and climate goals.

Key policy initiatives include:

YEKDEM (Renewable Energy Support Mechanism): Introduced in 2011, YEKDEM provides feed-in tariffs and purchasing guarantees for renewable electricity producers, incentivizing private sector investment in the sector.

National Energy and Mining Policy (2017): This strategic document emphasizes resource diversification, domestic energy production, and energy efficiency setting clear targets for renewables.

Green Certificate Market (YEKTG): Recently implemented, this mechanism allows electricity consumers to voluntarily purchase green energy and encourages transparency in renewable sourcing.

1.3. Sustainable Environmental Policies in Turkey

Environmental issues have increasingly gained prominence not only in global discourse but also within national policy agendas, as they intersect with political,

economic, and social dimensions of development. In the context of emerging economies such as Turkey, these challenges are further intensified by rapid industrialization, urban expansion, and a steadily growing population. Such dynamics exert significant pressure on natural resources and ecological systems, resulting in problems such as air and water pollution, deforestation, biodiversity loss, and climate-related vulnerabilities.

Turkey's environmental trajectory reflects the broader tension between economic growth and ecological preservation. While the country has achieved notable progress in infrastructural and economic development, this advancement has often occurred at the expense of environmental sustainability. Consequently, environmental governance has become a key area of concern in both national development plans and international commitments, such as the Paris Agreement and the United Nations Sustainable Development Goals (SDGs).

In this context, the formulation and effective implementation of coherent environmental policies are vital. These policies must not only address immediate environmental degradation but also incorporate long-term strategies for sustainability, climate resilience, and equitable resource distribution. Enhancing institutional capacity, promoting public awareness, integrating scientific research into policymaking, and fostering cross-sectoral collaboration are essential components of a comprehensive environmental policy framework. Ultimately, achieving environmental sustainability in Turkey requires a balanced approach that reconciles economic ambitions with ecological responsibility and ensures the well-being of both current and future generations.

1.4. Recent Developments in Turkey's Environmental and Climate Policy

Turkey has undertaken significant steps to address environmental concerns and align with global sustainability goals. Notably, in May 2024, the Turkish government released the English version of its "Climate Change Mitigation Strategy and Action Plan" (CCMSAP), outlining a comprehensive roadmap for reducing greenhouse gas emissions across various sectors. This plan emphasizes the transition to renewable energy sources, energy efficiency, and the adoption of cleaner technologies in industrial processes.

In tandem with mitigation efforts, Turkey has also focused on adaptation strategies. The "Climate Change Adaptation Strategy and Action Plan" (CCASAP) aims to enhance resilience against climate change impacts by promoting sustainable water resource management, ensuring agricultural and food security, and reducing the risks of natural disasters.

1.5. Advancements in Renewable Energy

Turkey has made notable progress in expanding its renewable energy capacity. By 2024, wind and solar energy accounted for nearly 18% of the country's electricity generation, marking a significant shift from traditional fossil fuels. The government projects that the share of renewable energy in total electricity production will rise from 45% in 2024 to 50% by 2028, with plans to increase installed capacity and enhance grid flexibility.

To support these ambitions, Turkey has introduced initiatives like the Renewable Energy Zones (REZ) tender model, aiming to attract investment in innovative projects such as offshore wind farms and floating solar power plants. Additionally, regulatory frameworks are being revised to simplify approval and permit procedures, fostering a more conducive environment for renewable energy investments.

1.6. International Collaboration and Investment

Turkey's commitment to renewable energy has attracted international support. In May 2024, the World Bank and Turkey signed a \$1 billion program to boost renewable energy efforts, focusing on developing distributed solar energy markets and piloting battery storage systems. This collaboration underscores the global recognition of Turkey's potential in the renewable energy sector and the importance of international partnerships in achieving sustainability goals.

Challenges and Future Outlook

Despite these advancements, Turkey faces challenges in fully realizing its environmental objectives. The country's continued reliance on coal-fired power plants has led to increased CO₂ emissions, making Turkey the leading polluter in Europe as of 2024. Addressing this issue requires a concerted effort to phase out coal dependency and invest further in clean energy alternatives.

Moreover, while Turkey has set a target to achieve net-zero carbon emissions by 2053, current policies allow emissions to continue rising until 2038, potentially delaying the attainment of this goal. Strengthening intermediate targets and implementing more ambitious policies are essential to align with the 1.5°C temperature goal outlined in the Paris Agreement.

The Historical Development of Environmental Policies in Turkey

The evolution of environmental policies in Turkey reflects both global environmental awareness and domestic political, economic, and social dynamics. While environmental considerations were largely absent from the national agenda in the early years of the Republic, increasing industrialization, urbanization, and population growth in the second half of the 20th century led to mounting

environmental pressures. As a result, environmental protection gradually emerged as a policy priority.

Turkey's initial environmental efforts were primarily reactive and limited in scope. The first significant legal framework was established with the enactment of the Environment Law (Law No. 2872) in 1983, which marked a turning point by formalizing the state's responsibility to prevent environmental degradation. The law introduced foundational concepts such as environmental impact assessments (EIAs), waste management regulations, and pollution control measures. During this period, institutional structures such as the Ministry of Environment were also established, demonstrating a growing recognition of the environment as a governance issue.

Throughout the 1990s and early 2000s, Turkey's environmental policy underwent further institutionalization, partly driven by the country's European Union accession process. Harmonization with EU environmental *acquis* became a central agenda, prompting the development of comprehensive legislation on air and water quality, biodiversity, climate change, and industrial emissions. International agreements, such as Turkey's ratification of the Kyoto Protocol (2009) and later the Paris Agreement (2021), further shaped the country's environmental commitments on the global stage.

In recent years, Turkey has integrated sustainability into national development strategies. The launch of the Eleventh Development Plan (2019–2023) emphasized green growth, sustainable resource use, and low-carbon development. Additionally, the Climate Law is currently under preparation to provide a comprehensive legal basis for climate action and facilitate the implementation of the country's net-zero emissions target for 2053.

Despite these advancements, challenges remain. Policy implementation gaps, insufficient enforcement mechanisms, and the dominance of short-term economic interests often undermine environmental governance. Moreover, the continued reliance on fossil fuels, especially coal, conflicts with Turkey's long-term sustainability goals.

In sum, the historical development of Turkey's environmental policy reflects a trajectory from reactive regulation toward more strategic and integrated approaches. As environmental issues become increasingly complex and interconnected with economic and social concerns, the country's policy framework must continue to evolve to ensure effective and inclusive sustainability governance.

Environmental regulation in Turkey began to institutionalize in the 1980s. The enactment of the Environment Law No. 2872 in 1983 laid the foundation for the country's environmental protection policies. During this period, environmental

governance was conducted through a centralized structure under the authority of the Ministry of Environment, which was later reorganized as the Ministry of Environment and Urbanization. In the 2000s, significant revisions were introduced to the environmental legislation as part of the harmonization process with the European Union (EU) *acquis*, marking a transformative phase in Turkey's environmental policy framework.

1.7. Current Institutional and Legal Framework

Turkey's current environmental governance structure is defined by a combination of institutional arrangements and legal instruments that aim to ensure sustainable development and environmental protection. The primary governmental body responsible for environmental policy implementation is the Ministry of Environment, Urbanization and Climate Change, which oversees a wide array of activities ranging from environmental impact assessments and climate policy to urban planning and waste management.

The legal foundation of environmental protection in Turkey remains the Environment Law No. 2872, enacted in 1983 and subsequently amended to align with evolving international standards and national needs. This law establishes the general principles for environmental conservation, outlines administrative responsibilities, and provides for punitive measures against violations. Over the years, it has been supplemented by secondary legislation addressing specific issues such as air and water quality, soil protection, biodiversity conservation, and hazardous waste management.

In addition to domestic legislation, Turkey's environmental framework is shaped by its international commitments, including the Paris Agreement, which it ratified in 2021, and various multilateral environmental agreements (MEAs) on biodiversity, climate change, and pollution control. These international instruments not only influence national policy direction but also necessitate the development of monitoring, reporting, and verification (MRV) systems in line with global standards.

The EU accession process has been a major driver of legal reform, particularly during the 2000s and 2010s. Turkey has made substantial progress in harmonizing its environmental legislation with the EU *acquis communautaire*, especially in areas such as waste management, industrial emissions, and environmental permitting. Regulatory tools such as the Environmental Impact Assessment (EIA) and the Strategic Environmental Assessment (SEA) have become integral components of policy-making processes.

Institutionally, Turkey also relies on decentralized implementation mechanisms through provincial directorates and local governments, although the system remains relatively centralized in decision-making. While significant

advancements have been made in legal harmonization and institutional development, challenges persist in enforcement capacity, inter-agency coordination, and public participation in environmental decision-making.

1.8. Turkey's International Commitments and Climate Change Policy

Turkey has been a party to numerous international environmental agreements, including the 1992 Rio Summit, the 1997 Kyoto Protocol, and the 2015 Paris Agreement. However, for many years, Turkey refrained from ratifying the Paris Agreement, citing its status as a developing country. It officially ratified the agreement only in 2021. This development has accelerated the country's policy formulation process aimed at achieving carbon neutrality. Nevertheless, the voluntary nature of Turkey's emission reduction targets introduces certain uncertainties in their practical implementation.

Environmental Issues and Effectiveness of Policies

The main environmental problems faced in Turkey include air and water pollution, biodiversity loss, forest destruction and waste management problems. The implementation effectiveness of the policies developed in the face of these problems is often limited due to reasons such as insufficient financing, lack of inspection and public awareness. In particular, the transparency and impartiality of environmental impact assessment (EIA) processes are frequently discussed in the public.

Future Perspectives and Policy Recommendations

Turkey's environmental policies need to be restructured based on the principle of sustainability. In this context, the following policy recommendations stand out:

- Local governments should be provided with a more active role in environmental management.

- Renewable energy investments should be encouraged, fossil fuel dependency should be reduced.

- Environmental education programs should be expanded, and the environmental awareness of society should be increased.

- Market-based mechanisms such as the emissions trading system should be implemented.

- Climate adaptation strategies should be developed in accordance with local conditions.

2. Results and discussions

Environmental issues cannot be regarded solely as internal matters of a single country. It is evident that the polluting activities of one nation inevitably affect not only its own environment but also the environmental conditions of neighboring countries. Pollution transcends national borders through water, air, transportation, and other means. Consequently, pollution ceases to be a domestic problem and becomes a transboundary issue affecting multiple countries.

Moreover, it is not only various forms of pollution but also the negative, uninformed, and irresponsible attitudes and behaviors of a country's population toward natural and cultural values that significantly diminish the habitability and quality of living environments. Such developments do not merely harm individual countries but also jeopardize the opportunity to benefit from the common heritage shared by humanity.

Leading organizations engaged in environmental work include specialized United Nations bodies such as UNESCO, HABITAT, UNEP, WMO, WHO, and UNDP. Among European institutions, the European Union, the Council of Europe, and the Organisation for Economic Co-operation and Development (OECD) play prominent roles. Occasionally, even NATO has been observed to engage with environmental matters. Furthermore, the contributions of international civil society organizations, such as Greenpeace and similar entities, should not be overlooked in addressing environmental challenges on a global scale.

Turkey has demonstrated an increasing dedication to advancing environmental sustainability and climate-related initiatives in recent years. Through the implementation of comprehensive policies, substantial investments in renewable energy infrastructure, and active participation in international partnerships, the country is progressing towards a more sustainable developmental trajectory. Nevertheless, significant challenges remain, notably the persistent dependence on coal, which must be addressed alongside elevating policy ambitions to align with international climate commitments.

This research introduces the operationalization of environmental sustainability gamification by integrating game mechanics and elements grounded in Self-Determination Theory (SDT). The core contribution is the formulation of the nineteen-item Environmental Sustainability Gamification Scale (ESGS), encompassing six dimensions: autonomy, competence, relatedness, enjoyment, self-efficacy, and self-presentation. The ESGS advances theoretical understanding of gamification applications within environmental sustainability and provides a robust instrument for future empirical investigations. Furthermore, the ESGS offers strategic insights for organizations

managing environmental sustainability efforts, aiding in the effective planning, administration, and promotion of such initiatives.

Policies that prioritize development and emphasize the eradication of poverty undoubtedly hold significant importance. However, since the 1980s, the concept of "sustainability," as developed under the auspices of the United Nations and most notably articulated in the 1987 Brundtland Report titled *Our Common Future*, has come to represent the principle of meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. This concept, often framed as a balance between conservation and utilization, was anticipated nearly seventy years earlier by Mustafa Kemal Atatürk, Turkey's founding leader, who famously stated: "People do not live solely as proprietors over the lands they inhabit; while using these lands, they must never forget that future generations also possess rights to use and benefit from them."

In Turkey, the Environmental Law No. 2872 enacted in 1983 established the aim of environmental policy as "the protection and improvement of the environment, the optimal use and preservation of rural and urban lands and natural resources, the safeguarding of the country's flora and fauna as well as its natural and historical heritage, and the prevention of water, soil, and air pollution." Later, the purpose clause of Law No. 5491, which came into force in 2006, defined the national environmental policy goal as "ensuring the protection of the environment considered a shared asset of all beings in accordance with the principles of sustainable environment and sustainable development."

In conclusion, beyond organized or unorganized pursuits of profit, we are confronted with an urbanization process that yields no benefit to society at large while imposing significant social costs. It appears necessary to redefine the concepts of public interest and societal benefit within the contexts of environment and urbanization. The solution seems to rest upon evolving into a legal society composed of individuals and leaders who embody a culture of urban citizenship, respect ethical values, and uphold environmental responsibility. This transformation, of course, is not an overnight aspiration but depends heavily on the sustained support of both formal and informal educational institutions.

Despite notable progress in environmental protection policies in Turkey over recent years, challenges related to implementation inefficiencies and deficiencies in strategic planning have impeded the full realization of the country's environmental sustainability objectives. Consequently, it is imperative to reinforce environmental policies beyond the legislative framework, emphasizing the enhancement of practical enforcement mechanisms. Employing a multi-stakeholder, inclusive, and scientifically grounded governance model is vital for Turkey to effectively confront its environmental issues.

Previous research on environmental sustainability has predominantly concentrated on sectors such as tourism (J. Wang et al., 2021), renewable energy (Qudrat-Ullah and Nevo, 2021), brand image (Vesal et al., 2021), as well as purchase intentions and brand loyalty (Panda et al., 2020). However, these studies largely overlook the role and potential impact of gamification in promoting environmental sustainability initiatives. While some investigations have demonstrated that gamification can enhance sustainable behavioral outcomes (Mulcahy et al., 2021) and improve sustainable performance (Behl et al., 2024), there remains a scarcity of comprehensive metrics to assess environmental sustainability gamification specifically.

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