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Extension of Human History with Spiritual, Intellectual and Technological Resources

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Abstract

The Creator created the earth in the image and likeness of the man Adam. Through Adam's knowledge of good and evil, evil was then spread among the nations. Nations create human history on earth. The Book of Revelation in the New Testament presents a global picture of the end of human history. The book offers a symbolic representation of the end of pernicious humanity's life on a sinful earth. Sinful humanity multiplies evil on a sinful earth. The world is in evil. Nations are unable to globally monitor spiritual processes to assess the escalation of human evil to the critical point of ending its life on earth. The spiritual activation of peaceful life by nations through good and righteous deeds contributes to the prolongation of human history. Advanced spiritual researchers of living nature are able to objectively perceive and monitor events in the surrounding space and subjectively assess the negative spiritual state of humanity. The UN Security Council and spiritual leaders can make the topic of the spiritual state of humanity a topic of discussion with the goal of calling on state leaders to neutralize negative global actions that influence the prolongation of human history. Globally, it is necessary to harmonize the lives of peoples with nature, focusing on the Creator's organization of a coordinated interaction between flora and fauna. In material life, humanity, using international technological swarm of interstate intelligent artificial assistants, can help find the best solution for organizing the global optimal use of resources in the interests of all humanity, without harming nature, taking into account the beneficial needs of humans, the peaceful life of peoples and the continuation of human history.

Keywords: extension of human history, spiritual aspects, longevity of humanity, technological swarm of state assistants, law of love

1. Introduction

This article explores the possibilities of extending human history through spiritual, intellectual, and technological resources. Extending the existence of humanity as a biological species and ensuring its long-term well-being involves a complex set of spiritual, material, technological, medical, environmental, and socioeconomic factors (Perry Stone, 2024). These aspects affect both physical survival and maintaining quality of life for as long as possible.

Extending human existence requires a comprehensive approach that integrates scientific research, technological innovation, political decisions, and changes in societal lifestyles. Key to this is not only increasing life expectancy but also maintaining its quality — spiritual, active, healthy, and socially meaningful longevity.

The second section of the article examines the spiritual aspects of extending humanity's existence on this sinful earth. The third section is devoted to extending human longevity. Extending human life through the spiritual law of love is discussed in the fourth section. The creation of an international technological swarm of state-controlled

intelligent assistants is discussed in the fifth section. The article concludes by establishing a connection between the end of time and the cooling of human love. Human history will end due to the internal devastation of people.

2. Spiritual Aspects of the Prolongation of Humanity's Existence on a Sinful Earth

The spiritual aspects of the prolongation of humanity's existence on a sinful earth in a religious context, particularly in Christianity, are associated with spiritual development, restoring connection with God, and transforming the world through love, repentance, and mercy. Earthly life is not simply a physical existence, but a period of preparation for eternal life and an opportunity for spiritual growth.

2.1 Earthly Life as a Path to God

According to Christian teaching, after the Fall, man lost his direct connection with God, but sparks of divine grace remained in his soul. Earthly life is viewed as an opportunity to return to God, to restore the lost connection with the Creator. Man can use this period for spiritual maturation, overcoming sins, and striving for virtue. Trials, hardships, and illnesses are perceived as tools that help free one from everything that hinders one's return to paradise.

2.2 Repentance

Repentance is a key element of the spiritual path. This is a profound change of mind, a shift in one's values, placing God at the center of everything. Repentance implies an awareness of one's sinfulness, a rejection of sin, and a desire to live in accordance with God's will. Characteristics of repentance:

* It is a lifelong process.

* It must be accompanied not only by words but also by deeds — a change in life, the eradication of sinful desires.

* True repentance is impossible without faith, and faith without repentance.

* Repentance brings one closer to God, who fills the soul with joy, peace, and light.

The Holy Fathers emphasize that repentance remains imperfect until the very hour of death.

2.3 Mercy

Mercy is seen as a manifestation of love for one's neighbor and for God. In Christianity, it becomes the essence of the moral law of human coexistence. Mercy not only helps others but also contributes to the spiritual growth of the individual. The meaning of mercy:

* It facilitates the world's transition to a more perfect state of being.

* The individual significance of mercy lies in its transcendental power, which leads the individual to new levels of spiritual development.

* Mercy is a manifestation of spiritual freedom associated with the presence of the divine principle within a person.

* Works of mercy include both material assistance and moral support, as well as prayer.

The Sermon on the Mount states: "Blessed are the merciful, for they shall obtain mercy" (Matthew 5:7).

2.4 Asceticism

Asceticism is a spiritual practice aimed at combating passions and achieving spiritual perfection. It includes prayer, fasting, struggle with thoughts, and other spiritual actions. The goal of asceticism is to achieve a state of destructive dispassion, that is, freedom from passions, and to draw closer to God. Characteristics of asceticism:

* Every Christian is called to spiritual struggle.

* Asceticism is a means of saving the soul through the acquisition of love for God and neighbor.

* Destructive passions are viewed as perverted human needs.

* Asceticism helps a person find inner harmony and silence from the passions.

2.5 Eucharist and Grace

In Christianity, the Sacrament of the Eucharist (Communion) is especially important. Through it, a person unites with Christ, accepts His life, and receives the gracious gift of eternal life. Communion becomes a source of strength for overcoming the urge to sin and striving for holiness.

2.6 Conclusion

The spiritual aspects of the prolongation of human existence are a period of spiritual development. Through repentance, a person recognizes their sinfulness and strives for correction; through mercy, they show love for their neighbor; and through asceticism and Communion, they receive strength for spiritual growth. These

spiritual practices are aimed at restoring connection with God, which, according to Christian teaching, is the key to eternal existence (Schema-Archimandrite Plakida, 2000; Valentin Pavlovich Sventsitsky, 2016; The Holy Saints of God on the Last Times, 2022; Elena Shatkovskaya, 2023; Elena Korzhova, 2023; Varsonofiy Optinsky and Elder Nektariy on the Last Times, 2023; Vilyuyan Boyarkin, 2025; Anna Ilyinskaya, 2025).

3. Extending Human Longevity

Extending human longevity is a complex, interdisciplinary task that encompasses intellectual, biomedical, social, ethical, psychological, and philosophical aspects. These factors determine how society perceives, regulates, and utilizes life-extension technologies.

3.1 Scientific and Technological Aspects

Modern research in gerontology and the biology of aging aims to understand the mechanisms of aging and develop methods to slow or reverse it. Key areas include:

Gene therapy and genome editing. Scientists are seeking ways to target genes associated with aging and are developing drugs that can modify the function of specific genes.

Epigenetics. Researchers analyze how changes in the chemical structure of DNA influence cellular aging and are attempting to develop drugs to control the cellular “molecular clock.”

Stem cell research. For example, Chinese scientists have created genetically modified stem cells enriched with the FOXO3 gene (the “longevity gene”). Their administration to elderly macaques improved cognitive function and reduced signs of aging.

Correcting the function of lysosomes, cellular structures involved in the removal of damaged components. Experiments in mice have shown that inhibiting excessive lysosome activity can rejuvenate blood stem cells, strengthening the immune system and reducing the risk of age-related diseases.

Developing Senolytics, drugs that destroy “zombie cells” (senescent cells) that have stopped dividing and functioning normally.

Work is also underway on “aging clocks” — methods for assessing biological age using various markers, such as epigenetic changes in DNA. The need for an ethical code for developers of anti-aging drugs is being discussed. Such a document should prioritize patient health, mechanisms for monitoring research and safety, and the principle of equal access to technologies regardless of social status.

3.2 Social and Economic Consequences

Life extension technologies can fundamentally change society:

Pension systems and the labor market. If people live and work longer, this will require a revision of economic models and social guarantees.

Family and relationship dynamics. Perceptions of reproductive age and intergenerational relationships may change.

Generational change. Increased influx of young minds into various fields.

3.3 Regulatory Framework

To manage the development of longevity technologies, an appropriate regulatory framework governing research, production, and application is necessary. It is important to ensure oversight of the safety and effectiveness of such technologies, as well as their availability within the healthcare system (Evgenii Brindin, 2026).

3.4 Conclusion

The intellectual aspects of longevity extension encompass not only scientific and technological developments, but also a wide range of social, ethical, psychological, and philosophical issues. The key challenge is balancing the pursuit of longevity with maintaining social justice, ecosystem sustainability, and human well-being.

4. Creating an International Technological Swarm of State Intelligent Assistants

Creating an international technological swarm of state intelligent assistants to optimize the use of global resources for the benefit of humanity is a promising but complex task that requires a comprehensive approach and the resolution of a number of technical, political, and ethical issues. Such a system could unite AI assistants from different countries to analyze global problems, model scenarios, and develop collaborative solutions. An international technological swarm of state intelligent assistants must possess deep and broad operational analytics, integrating data into daily decisions. Such initiatives are currently in the development and discussion phase and have not yet been fully implemented (Roman Uvarov. (2026; Evgenii Brindin, 2026b; Heli, 2026).

China’s Kimi AI 2.5 with Agent Swart activates up to 100 subagents simultaneously to solve a single complex problem.

Lim Coh, Chief Technology Officer for High-Performance Computing and Artificial Intelligence at Hewlett Packard Enterprise, predicts the success of the combination of swarm AI, blockchain, and quantum computing. Coordinating AI assistants via blockchain will allow countries to share their achievements with each other.

4.1 Potential of AI in Resource Management

Artificial intelligence is already demonstrating effectiveness in solving problems related to resource management and global challenges. For example:

Energy. AI can forecast energy supply and demand, optimize the operation of renewable energy sources (solar panels, wind generators), and manage resource allocation.

Agriculture. AI-based systems help plan the use of water, fertilizers, and pesticides, and predict crop yields, leading to more efficient and environmentally friendly production.

Ecology. AI is used to monitor biodiversity, predict natural disasters, and detect illegal logging or fires.

Water Resources Management. Algorithms can analyze water consumption data and suggest measures for its rational use.

In public administration, AI assistants are already being used to automate document processing, citizen requests, and improve the efficiency of officials. Such systems can be scaled up to the international level.

4.2 International AI Initiatives

There are initiatives aimed at cooperation in the field of AI:

BRICS. In 2024, at the Kazan summit, a framework program for BRICS cooperation in the field of AI was adopted. Projects are being implemented in the areas of smart agriculture, climate change forecasting, and language processing among BRICS countries. The BRICS AI Success Hub platform has been created for sharing AI application cases.

China's Initiative on Global AI Governance. In 2023, President Xi Jinping proposed the initiative, which incorporates the principles of balance, fairness, and shared governance. At the 2025 World Conference on Artificial Intelligence, China proposed the establishment of a World AI Cooperation Organization for global innovation collaboration and security governance in this area.

UN Cooperation. The ITU (International Telecommunication Union), in partnership with the UN, academia, industry leaders, and NGOs, is promoting AI applications that have a positive societal impact in areas such as healthcare, climate change, education, disaster relief, and the ethical governance of AI.

4.3 Challenges and Limitations

Creating a global swarm of AI assistants faces a number of challenges:

1) Technical Difficulties. Unified standards and interaction protocols must be developed, ensuring compatibility between various AI systems, which may be based on different technological platforms (Evgeny Bryndin, 2026a).
2) Ethics and Regulation. Principles for the ethical use of AI must be defined, algorithmic bias must be prevented, and systems must be transparent and accountable. International regulation that takes into account the interests of humanity as a whole is needed.
3) Geopolitical Issues. Respecting the sovereignty of states and avoiding technological monopolies is essential.
4) Digital Divide. Not all countries have the same level of access to technology, computing power, and data. Equal access to AI assistants must be achieved across countries.
5) Data Privacy. Data exchange between countries raises concerns about the protection of personal information and system security.
6) Limitations of Current AI Models. At the current stage of development, language-generative AI models have limitations in their ability to effectively solve complex, integrated problems that require a deep understanding of the context and an interdisciplinary approach.

4.4 Prospects

If the above tasks are successfully addressed, an international technological swarm of government AI assistants could become a tool for:

* Modeling global resource use scenarios, taking into account climatic, economic, and social factors;

* Selecting optimal strategies;

* Coordinating international efforts to combat climate change, poverty, and resource scarcity;

* accelerating scientific research in the field of sustainable development.

The key to success will be multilateral cooperation, including governments, businesses, scientific communities, and international organizations, with an emphasis on spiritual principles, justice, and the responsible use of technology.

5. Extending Humanity's Life Through the Spiritual Law of Love

Extending humanity's life through the spiritual law of love presupposes that love, as the foundation of interpersonal relationships, self-improvement, and harmonious coexistence, can become the foundation for the sustainable development of society and the continuation of the human race.

5.1 Love as a Spiritual Law

In Christian teaching, love is viewed as the highest law of life, which should permeate all aspects of human existence—both personal and social. Love for God and neighbor is the concentrated expression of Christian law, where it is impossible to keep one commandment while violating another. The Apostle John the Theologian emphasizes: "Whoever says, 'I love God,' and hates his brother, is a liar. For he who does not love his brother whom he has seen, how can he love God whom he has not seen?" (1 John 4:20).

Love is a sacrificial virtue that does not envy, does not boast, is not puffed up, and does not seek its own (1 Cor. 13:4–8). It becomes the driving force that leads a person to divine likeness through spiritual development. Such love arises only through the struggle with passions (egoism, envy, pride, etc.) and the purification of the soul.

5.2 Love and the Prolongation of Life

From a spiritual perspective, love prolongs life because it gives meaning and purpose to existence. When a person loves and is loved, they value their life, strive for personal development, and see value in it for the sake of communication with their loved one or God. Love overcomes spiritual isolation and existential loneliness, connecting people and opening them to the world.

From a scientific perspective, love also has a positive effect on the length and quality of life:

Stress Reduction. Love lowers cortisol levels (the stress hormone), reduces anxiety, and reduces inflammation in the body. Strong social connections are associated with a lower risk of cardiovascular disease.

Improved physical health. People in stable, loving relationships have lower blood pressure and are less likely to suffer heart attacks. Love and social support boost immune cell activity.

Motivation for self-care. A loving person or someone who is loved is more likely to give up bad habits, watch their diet, and seek timely medical attention. Love acts as an anchor that prevents self-destruction.

Love gives meaning to life. It stimulates cognitive activity (empathy, remembering, planning for the future) and emotional stability. Love generates feelings of security, acceptance, and support.

5.3 Love as the Foundation of Sustainable Human Development

Some researchers believe that the evolutionary significance of love lies in its ability to perfect a person, inspire creativity and transformation. Love shapes ideals and contributes to the development of nature, humanity, and society. Sociologist P. Sorokin expressed the idea that without increasing selfless, creative love at all levels of society, there can be no progress in the world. Love is important not only for personal growth but also for the sustainable development of society as a whole.

Prolonging human life through the spiritual law of love presupposes cultivating selfless, sacrificial love, which becomes the foundation of harmonious relationships, personal growth, and the sustainable development of society (Bryndin E.G., & Bryndina I.E., 2019; Evgeny Bryndin, 2020; Evgeny Bryndin, 2026b). This requires overcoming egoism, developing the ability to understand others, caring for others, and adhering to spiritual and moral principles.

6. Conclusion

Humanity has developed and, through the UN, granted equal rights to all. Now, developed Western countries are stripping states of their rights through sanctions. Global financial digital activity will strip the rights of all who disobey the masters of the financial technological world.

The history of humanity is decided on a spiritual level. It is already set by Adam's pernicious spiritual decision to know good and evil. The human race originated from a single bloodline. The spiritual perniciousness continues from generation to generation. It is proposed that everyone and the entire world live according to the law of Orthodox love and form an Orthodox democracy (the power of the people) (Evgeny Bryndin, 2025). The history of sinful and selfish humanity will end on the sinful earth with the cooling of spiritual love (New Testament, Revelation).

The end of time is associated with a cooling of human love. This cooling of love as a sign of the end of human history is traced back to the Gospel of Matthew (24:12): "And because lawlessness will increase, the love of many will grow cold. This is an indication of moral decline before the end of earthly history:

1) The fading of spiritual love for God. This is not simply about interpersonal relationships, but about the loss of connection with higher values, the forgetting of the commandments.
2) Distortion of the understanding of love. Love is replaced by comfort, profit, or tolerance at any cost — without reliance on moral absolutes.
3) Growth of egoism and indifference. People become self-focused, their hearts "cooling" to the pain of others.
4) Connection with the increase of lawlessness. The cooling of human love is a consequence of the spread of lawlessness and sin, which displaces spiritual guidelines.
5) Not an external, but an internal crisis. The end is connected not so much with natural disasters or wars (which are also mentioned in the prophecies), but with the state of human hearts.
6) Freedom of choice. Cooling is not a fatal inevitability, but the result of human decisions.

Today, the cooling of love can be seen in:

* The rise of individualism and material consumption;

* The erosion of traditional values;

* The emotional fatigue of society, cynicism;

* The replacement of love with superficial, non-committal relationships.

Human history will end due to the inner emptiness of people. Humanity will cool love on earth with lawlessness. The cooling of love is a symptom of the loss of meaning, when people stop striving for something greater than momentary desires, and the world degrades spiritually. Those who are ready to live by the law of love will be resurrected to eternal life on a new earth.

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Weaving Memory, Weaving Family: Familism, Continuing Bonds, and Material Heritage in Francisco Arcellana's *The Mats*

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Abstract

In this paper, the author focuses on the Reading of Francisco Arcellana's story *The Mats* (1938) as an expression of Filipino familism, ancestral memory, and the significance of material objects in the family's everyday life. Drawing on scholarship in Filipino cultural psychology, the sociology of grief, and material culture analysis, the author argues that the sleeping mats given to family members by Mr. Jaime Angeles serve as both heirlooms passed down from one generation to another and a means of establishing relationships with the deceased. Looking through Arcellana's story, the author shows that it portrays Filipino culture as one based on the importance of family ties, highlighting the process of maintaining family connections through naming, gifting, and creating, which functions as a classic example of an early Philippine short story in English.

Keywords: Francisco Arcellana, *The Mats*, Filipino familism, continuing bonds, material culture, utang na loob, Philippine literature

1. Introduction

Francisco Arcellana's short story *The Mats* was published in 1938 and has been read well into the decades after World War II. It tells the story of a father bringing home mats, properly woven for each member of his family. What at first appears to be a cheerful story turns out to be a very grim one as soon as the readers learn about three more mats that symbolize the couple's three children who died when they were infants. This article argues that the story cannot be viewed merely as a depiction of Filipino family ties but must be understood as a dramatization of several relevant cultural processes. These processes include familism as the leading principle of social life, the practice of maintaining ties with the dead, the customs concerning relics, and the rule associated with Filipino psychology, known as utang na loob.

The story's enduring significance lies in how it anticipates ideas that later became established in the field of social science, which in the short story manifest as the ritual of unfurling mats and uttering names. At the same time, cultural psychologists will later call this familism (Choi, Kim, & Noh, 2017) and kapwa (David, Sharma, & Petalio, 2017). In contrast, researchers of grief will describe the family's insistence on including the dead in the count of the living as a case of continuing bonds (Rothaupt & Becker, 2007). The present paper brings together the two bodies of literature. It demonstrates how a story about a mundane household object contains a coherent, culturally specific theory of families, memory, and mourning.

2. Literature Review

2.1 Filipino Familism and Kapwa in Cultural Context

Familism, which broadly refers to a cultural trait promoting family loyalty, unity, and interdependence over individualistic values, is said to play an important role in the social life of Filipinos. Indeed, Choi, Kim, and Noh (2017) found that Filipinos in the U.S. practice familism more than Korean Americans do, as they instill these

values in their children. David, Sharma, and Petalio (2017) connect this idea to the broader Filipino notion of kapwa, which refers to the relational and shared identity where the self is intertwined with others, especially the family; they also remind us that colonial history has placed pressure on kapwa, making its active practice a cultural necessity rather than a passive inheritance. Alampay (2024) adds to this story by presenting evidence that scores of Filipino parents hold collectivist beliefs and show high expectations from their family and high levels of warmth toward their children, thus, indicating that familism is not only an abstract concept but also a real experience that shapes everyday lives of families, which is displayed by Mr. Jaime Angeles's efforts in providing individualized presents to his children.

2.2 Continuing Bonds: Grief, Memory, and the Presence of the Dead

The second category of literature, situated within the domain of bereavement psychology, has a terminology that can help comprehend the methods families like the Angeles keep their deceased family members alive in their everyday lives. Rothaupt and Becker (2007) note the change in the Western bereavement paradigm from the previous approaches which equated grief with the removal of the deceased from family context to the contemporary 'continuing bonds' paradigm, where keeping up the relationship with a deceased person is considered a normal and often healthy part of the grieving process. Millar and Lopez-Cantoro (2022) take this concept further, arguing that it can be said that love for the deceased is conserved differently than it may have used to be and that the people who suffer the loss also retain the power of affecting the memory of the deceased even though at a particular point in time the quality of the relationship changes.

Sękowski (2021) also distinguishes between concrete and symbolic manifestations of continuing bonds, noting that concrete manifestations are associated with unresolved mourning. In contrast, symbolic manifestations, such as rituals, objects, and practices of remembrance, are more likely to reflect effective mourning. This is an important distinction in interpreting the mats of Mr. Jaime Angeles, as they can be read as a symbolic, continuing bond representing a non-pathological, ritualized way of keeping the memory of Josefina, Victoria, and Concepcion alive.

2.3 Heirlooms and Memory Objects: Material Culture as Vessel of Family History

Scholarly work on material culture and consumer research shows why an ordinary object like a woven mat evokes such strong emotions and carries cultural implications. Türe and Ger (2016) characterize heirlooms as expressions of familial identity and continuity, arguing that such objects serve as "anchors of rootedness" because they are regarded as enduring, changing little from generation to generation. Marschall (2019) reaches a similar conclusion that utilitarian objects, especially those given as gifts, often develop into "memory objects" over time, collecting emotional values due to repeated use and acts, rather than their financial attributes, which reflects the story's description about Jaime and Emilia's wedding mat that was only used during the wedding and afterward only for some other desired occasions.

According to Bronec (2019), who investigated how memory is passed down through heirlooms from one generation to another after war, these objects yield the same results regardless of each family's historical context, as heirlooms' importance lies not in their material side but in the events and relationships they evoke. Overall, based on this literature, we can say that the role of the banig in Arcellana's story seems to be more than just a detail of local character.

2.4 Paternal Authority and Gift-Giving as Reciprocity (Utang na Loob) in the Filipino Family

Research on the Filipino family context and network suggests that Mr. Jaime Angeles is a unique figure who serves as the principal provider and distributor of the mats. In their studies, Harper (2009) and Jocson (2020) suggest that the father plays an important role in the family, even though he holds formal authority over the household. Alampay (2024) stresses that fathers in the Philippines are still perceived as the heads of families.

The concept of "utang na loob" is defined by the related literature on cultural gift-giving, and the term literally translates to "debt of the heart" (Rungduin et al., 2015). Utang na loob is described by Gavino et al. (2023) as not merely gratitude, but rather a social bond resulting from the expression of care by one person to another. Maido (2022) uses a Bourdieusian lens to demonstrate that utang na loob can function as a form of "symbolic capital," helping to solidify social networks of trust. Viewed through the lens of such literature, one can interpret Mr. Jaime Angeles's mats not as mere gifts, but as a means of establishing or maintaining family connections with loved ones, or with deceased daughters in particular.

3. Methodology

The research employed a qualitative analysis of *The Mats* by Arcellana, based on four cultural interpretative terms identified in the earlier part of this paper: familism, continuing bonds, material heritage, and reciprocal gift-giving (utang na loob). The narrative has been analyzed based on notions of family reunion and hierarchy, the elaboration on the dead children, the description of the mats (their origin, craftsmanship, and application),

and gift-giving. These textual observations have been decoded using the cultural vocabulary of Filipino cultural psychology (familyism, kapwa, utang na loob), sociology and philosophy of grief (continuing bonds), and material culture.

4. Historical and Cultural Context

The setting of *The Mats* is a Filipino household in the early twentieth century, highlighting that, in a family, the focus now centers on the family unit rather than on the individual as the primary social and emotional unit of our lives at the time. Family traditions and practices at that time revolved around the obedient relationship children had with their parents and the value of generational continuity and the preservation of family material possessions, which can be linked to findings from later research (Choi, Kim, & Noh, 2017). The reality of sick relatives and child loss, which are mentioned directly in the family story about the suffering of a family long ago, were common for that time, so preserving the memory of a dead child became a normal thing to do culturally.

The banig is part of a wider Filipino tradition of handmade craftsmanship, in which items are ordered from local artisans rather than bought, a preference the narrator cites as being typical of Papa's attitude to gift-giving, showing the importance of handmade over mass-produced items. This historical context, including close-knit families, high death rates, and a craft economy in which items were created specifically for their owners, could be regarded as the soil from which the story's main symbol derives its full cultural significance.

5. Analysis and Discussion

5.1 The Banig as Heirloom and Memory Object

This narrative puts forward two distinct sorts of mat: the traditional marriage mat and the newly created family mats, which function based on the principles of heirlooms and memory objects outlined by Türe & Ger (2016) and Marschall (2019). In this way, the old marriage mat, which was used solely in the night of Jaime and Emilia's marriage and preserved only for special occasions, illustrates Türe and Ger's (2016) explanation of the function of an heirloom as a foundation for family identity because its value lies in the fact that it preserves the memory of the beginning of the marriage in time, rather than having any monetary value. The newly created mats serve as a demonstration of Marschall's (2019) explanation of how simple household objects can become memory objects through the intention to create memories about their use.

5.2 Papa's Authority as Custodian of Family Memory

Mr. Jaime Angeles occupies a position in his family that conforms to the pattern of behavior demonstrated by Filipino fathers, according to the work of Harper (2009) and Jocson (2020). The comeback he makes at home is described as unforgettable. At the same time, his performance of distributing each mat allows him to play a role in which he turns the abstract concept of family unity into tangible, personalized gestures. Significantly, this role has to do with memory in and of itself in that it is Papa who decides on the provision of mats for the deceased daughters, not to mention the frequent asking of a rhetorical question which implies the idea that he cannot forget them, marks him as the head of the family not only in terms of family unity but also as the keeper of family history.

5.3 The Mats for the Dead: Continuing Bonds and Familial Grief

The scene in which Mr. Jaime Angeles discloses the mats intended for Josefina, Victoria, and Concepcion is regarded as the quintessential example of continuing bonds described by bereavement researchers. His handling of his daughters' passing is not about ending relationships, but rather what Millar & Lopez-Cantero (2022) refer to as a changed yet still functioning non-reciprocal connection, maintained through naming, giving gifts, and including them in family ceremonies. Based on Sękowski's distinction (2021) between concrete and symbolic continuing bonds, the mats are symbolic bonds, meaning they do not seek to replace or physically represent deceased daughters but are seen as ritualistic objects through which Papa's family seals the presence of their deceased. The interpretation of this feature is supported by Papa's practice of calling each of his daughters by name during his presentation of the mats, which resembles the naming and remembering practices of Rothaupt & Becker (2007) regarded as essential for proper engagement with continuing bonds.

5.4 Gift-Giving, Utang na Loob, and the Economy of Familial Love

Although utang na loob is traditionally used to explain acts of service performed by one non-relative to another and by one generation to another based on debts incurred and discharged (Rungduin, Rungduin, & Joshua, 2015; Gavino, Donato, & Panotan, 2023), its principles of reciprocal obligations and rendering gratitude also shed light on the emotional background of Papa's gifting scene. Thus, Maido (2022) points out that 'utang na loob', analyzed in the light of Bourdieu's approach as a form of symbolic capital establishes social bonds between givers and recipients and makes the practical function of mats much wider than their being bedding: each mat obligates the recipient to recall the sender's contribution and to show the sense of gratitude that comes from the

Filippino culture. Since the same principles can be applied to Papa's daughters, who cannot reciprocate the gift in question, the asymmetry generated by this situation becomes painfully evident: daughters cannot accept or give back any material gifts, but this does not prevent Papa from treating them the way he treats other family members.

6. Conclusion

Through the humble ritual of giving out woven sleeping mats, *The Mats* articulates a clear theory of family: cohesion is actively carried out, grief transforms rather than separates families, and common household items carry memories, gratitude, and belonging. When read in conjunction with scholarship on Filipino familism, kapwa, the psychology and philosophy of continuing bonds, material culture and studies of heirlooms, and the cultural logic of utang na loob, the story's key symbol stands out as a notably complex formulation of the values at the core of Filipino cultural psychology.

Mr. Jaime Angeles's declaration that his late daughters are still present among us and in our hearts is not merely an expression of sentimentality but a valid conception of the lasting-tie model of grief, as demonstrated through the specifically Filipino language of family, craft, and presents. The above interpretation emphasizes Arcellana's story as a meaningful literary work for the understanding of Filipino family life at present, especially considering the importance of diaspora and migration and the changes in family life which affect the way people remember their families and live their lives.

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A Legal Appraisal of the Role of Non-Governmental Organizations in Forest Conservation Within the CEMAC Region

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Abstract

This article examines the role of non-governmental organizations (NGOs) in forest conservation within the Central African Economic and Monetary Community (CEMAC) region, comprising Cameroon, Congo, Gabon, Equatorial Guinea, Chad, and the Central African Republic. The research employs a doctrinal legal research methodology combined with qualitative case study analysis. Primary legal instruments examined include Cameroon's Law No. 2024/008 of July 24, 2024 on the forestry and wildlife regime, the Republic of Congo's Law No. 33-2020 of July 8, 2020 on the forestry code, and regional CEMAC decisions, particularly Decision No. 06/24-UEAC-225-CM-41 of February 23, 2024 on the progressive prohibition of tropical timber exports in log form. Secondary sources include NGO reports, academic literature, policy documents, and institutional materials from organisations such as the Environmental Investigation Agency (EIA), the Network of Protected Areas of Central Africa (RAPAC), the Environment and Rural Development Foundation (ERuDeF), and the Network of Indigenous and Local Populations for the Sustainable Management of Forest Ecosystems in Central Africa (REPALEAC). The study finds that NGOs in the CEMAC region perform multifaceted roles encompassing advocacy and policy influence, protected area management, community engagement and capacity building, research and monitoring, and litigation and enforcement. However, these organizations face significant challenges including limited financial resources, constrained legal mandates, operational insecurity, insufficient coordination with state institutions, and restrictive regulatory environments. The research further reveals that recent legal developments—particularly the adoption of Cameroon's new forestry law after sixteen years of legislative revision and the CEMAC Council of Ministers' decision to progressively ban log exports by 2028—have created both opportunities and challenges for NGO engagement in forest governance. The article recommends enhanced legal recognition of NGO roles in forest governance frameworks, establishment of sustainable funding mechanisms including the operationalisation of the proposed CEMAC solidarity fund for climate change, strengthened coordination mechanisms between NGOs and state institutions, capacity building for local and indigenous NGOs, improved access to environmental information and justice, and the inclusion of civil society in the implementation of regional forest policy decisions.

Keywords: non-governmental organizations, forest conservation, CEMAC, Central Africa, forest law, environmental governance, sustainable forest management, log export ban, community forestry

1. Introduction

Forests constitute one of the most critical ecosystems for global environmental stability, biodiversity conservation, and climate change mitigation. The Congo Basin, of which the CEMAC region forms a substantial part, contains the world's second-largest tropical rainforest, spanning approximately 200 million hectares and storing an estimated 30 billion tonnes of carbon.[1] This vast forest estate provides essential ecosystem services,

[1] Congo Basin Forest Partnership. (2023). The Forests of the Congo Basin: State of the Forest 2022, p. 15.

supports the livelihoods of over 60 million people, and harbours exceptional biodiversity, including endangered species such as forest elephants, gorillas, and chimpanzees. The Central African forest ecosystems are home to exceptional biodiversity, offering vast potential for the socio-economic development of the region. As a representative from REPALEAC stated, "The forests of Central Africa are not just natural resources; they are the lifeblood of our communities, sustaining our way of life and our cultural heritage."[1]

Globally, the recognition of forests as vital carbon sinks and biodiversity repositories has intensified since the adoption of the Paris Agreement in 2015 and the subsequent development of REDD+ (Reducing Emissions from Deforestation and Forest Degradation) frameworks.[2] International instruments such as the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) have progressively emphasized the importance of participatory governance and the inclusion of non-state actors in forest management.[3] This global trend towards multi-stakeholder governance has created space for non-governmental organisations (NGOs) to assume increasingly significant roles in forest conservation. The Congo Basin's forests have been positioned to play a leading role in reducing greenhouse gas emissions, though implementation details remain to be fully developed.[4]

At the regional level, the CEMAC region faces acute forest governance challenges. These include illegal logging, weak enforcement of forestry regulations, land-use conflicts between conservation and development objectives, limited local processing capacity, and the marginalisation of indigenous and local communities in forest management decisions.[5] The region's forests continue to experience significant deforestation and degradation, driven by agricultural expansion, infrastructure development, and unsustainable timber extraction. These challenges are compounded by climate change impacts, which threaten forest resilience and the livelihoods of forest-dependent communities. The Environmental Investigation Agency (EIA) has conducted a forest campaign in Central Africa for over a decade, highlighting that the export of logs is "very critical" and has benefitted forest offenders to the detriment of ecosystems, communities, and national economies.[6] According to EIA's investigations carried out in Congo Basin countries for over a decade, the export of logs against national laws is arguably the largest forest crime, both in volume and revenues, in the region.[7]

Within this complex governance landscape, NGOs have emerged as influential actors in forest conservation. Since the 1990s, international and national NGOs have established a significant presence across the CEMAC region, engaging in activities ranging from policy advocacy and legal reform to community-based conservation and protected area management.[8] The evolution of forest governance frameworks—particularly the recent adoption of revised forestry legislation in several CEMAC member states—has both reflected and been influenced by NGO advocacy efforts. This article examines the multifaceted role of NGOs in forest conservation within the CEMAC region. It analyses the legal and institutional framework governing forest management, appraises the specific contributions of NGOs, identifies the challenges they face, and proposes recommendations for enhancing their effectiveness in forest governance.

2. Conceptual Overview

Non-governmental organisations are broadly defined as legally constituted, non-profit, voluntary organisations that operate independently of government control.[9] In the context of forest conservation, NGOs encompass a diverse range of entities, including international conservation organisations (e.g., World Wildlife Fund, Conservation International), regional networks (e.g., Network of Protected Areas of Central Africa – RAPAC), national conservation foundations (e.g., Environment and Rural Development Foundation – ERuDeF), and

[1] REPALEAC. (2024). Network of Indigenous and Local Populations for the Sustainable Management of Forest Ecosystems in Central Africa. Mission Statement.

[2] Paris Agreement, 2015, UN Doc. FCCC/CP/2015/L.9/Rev.1, art. 5.

[3] Convention on Biological Diversity, 1992, 1760 UNTS 79, art. 6; United Nations Framework Convention on Climate Change, 1992, 1771 UNTS 107, art. 4.

[4] Brown, H.C.P. (2019). *The Role of Non-Governmental Organisations in Forest Governance in Central Africa*. PhD Thesis, University of Cambridge, p. 45.

[5] Environmental Investigation Agency. (2020). *Tainted Timber, Tarnished Temples*, p. 12.

[6] Environmental Investigation Agency. (2026). *Cameroon Advances CEMAC Log Export Ban: An Important Step To Combat Forest Crime*. Press Release.

[7] *Ibid.*

[8] Brown, op. cit., p. 78.

[9] The World Bank. (1990). Operational Directive on NGOs and the Bank, para. 2.

community-based organisations.[1] RAPAC, for instance, is an implementing and advocacy NGO that focuses on the preservation of natural resources and biodiversity in protected areas across nine Central African member countries: Gabon, Congo, Democratic Republic of Congo, Equatorial Guinea, Chad, São Tomé and Príncipe, Rwanda, Cameroon, and the Central African Republic.[2]

Forest conservation refers to the protection, preservation, management, and restoration of forest ecosystems.[3] It encompasses biodiversity conservation, sustainable forest management, climate change mitigation, and the protection of forest-dependent communities' rights and livelihoods. In the CEMAC context, forest conservation is pursued through multiple mechanisms, including protected area designation, sustainable logging concessions, community forestry, and payment for ecosystem services schemes.[4] The Network of Protected Areas of Central Africa (RAPAC) aims to improve the state and management of protected areas, as well as promote knowledge of the value of such areas among the general populace, gathering biodiversity and socioeconomic data in the protected areas to inform these efforts.[5]

The role of NGOs in environmental governance has evolved significantly over the past three decades. Initially focused on awareness-raising and advocacy, NGOs have increasingly assumed operational roles in conservation, including protected area co-management, community engagement, scientific research, and monitoring of forest law compliance.[6] This evolution reflects broader trends in environmental governance towards multi-stakeholder participation, decentralisation, and the recognition of non-state actors as legitimate governance partners. In the CEMAC region, the growth of NGO activity has been closely linked to the international discourse on sustainable development and the increasing availability of international conservation funding.[7]

3. Legal and Institutional Framework

3.1 International Legal Framework

The international legal framework for forest conservation provides the normative foundation for national and regional forest governance in the CEMAC region. The Convention on Biological Diversity (CBD, 1992) requires parties to develop national biodiversity strategies and action plans, establish protected area systems, and promote sustainable use of biological resources.[8] The United Nations Framework Convention on Climate Change (UNFCCC, 1992) and the Paris Agreement (2015) establish frameworks for climate change mitigation, including REDD+ mechanisms that provide incentives for forest conservation.[9] The Convention on International Trade in Endangered Species (CITES, 1973) regulates international trade in endangered species, including many forest-dependent species found in the CEMAC region.[10] These instruments create obligations for states that NGOs often monitor and use as benchmarks for advocacy.

3.2 Regional Legal Framework: CEMAC Instruments

The CEMAC has developed a growing body of forest-related instruments through the Economic Union of Central Africa (UEAC). The most significant recent development is Decision No. 06/24-UEAC-225-CM-41 of the Council of Ministers of the UEAC, adopted on February 23, 2024, in Bangui, Central African Republic, to progressively ban the export of tropical timber in log form.[11] Under this decision, from January 1, 2025, CEMAC member states and the Democratic Republic of Congo must take measures for progressive prohibition, with a full and absolute ban taking effect from January 1, 2028.[12] After that date, only timber products that have undergone secondary processing in the country of origin may be exported. However, log exports remain permitted between CEMAC countries and with the DRC to encourage industrial exchanges and cross-border

[1] RAPAC. (2024). Organisation Profile.

[2] *Ibid.*

[3] Convention on Biological Diversity, op. cit., art. 2.

[4] Cameroon, Law No. 2024/008 of July 24, 2024 on the Forestry and Wildlife Regime, arts. 33-49.

[5] RAPAC, op. cit.

[6] Brown, op. cit., p. 102.

[7] *Ibid*., p. 115.

[8] Convention on Biological Diversity, op. cit., art. 6.

[9] United Nations Framework Convention on Climate Change, op. cit., art. 4; Paris Agreement, op. cit., art. 5.

[10] Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973, 993 UNTS 243, art. 2.

[11] CEMAC, Decision No. 06/24-UEAC-225-CM-41 of the Council of Ministers of the Economic Union of Central Africa, February 23, 2024.

[12] *Ibid*., art. 1.

value chains.[1] This decision represents a long-standing advocacy priority for environmental NGOs in the region, including the EIA, which has been campaigning for stronger controls on log exports.[2]

The decision followed several postponements from an initial January 2022 date to January 2023, and then to the current 2028 deadline.[3] The postponements have been attributed to pressure from forestry industry lobbies and concerns over fiscal revenue losses.[4] As a source within the CEMAC Commission noted, "This is not the first time there has been such a postponement," with the earlier implementation attempts having been "defeated by the victory of the large forestry operator lobbies" who pressure governments to continue log exports.[5] Officially, the hesitation of four CEMAC countries—Cameroon, Chad, the Central African Republic, and Equatorial Guinea—to implement the ban stems from the significant fiscal revenue losses that the decision would entail.[6]

In 2025, the CEMAC Council of Ministers adopted a new directive establishing a harmonised framework for incentive forestry taxation related to the export of processed wood products, aiming to encourage local processing and create a level playing field for timber industries.[7] The CEMAC budget for 2025, adopted at the 42nd ordinary session of the UEAC Council of Ministers, amounts to 82,981,074,871 CFA francs, representing a slight decrease from the previous fiscal year.[8] The budget provides for the creation of a solidarity fund to respond to climate change challenges in the CEMAC zone, reflecting the region's growing recognition of the links between forest conservation and climate resilience.[9]

3.3 National Legal Frameworks

At the national level, recent legislative reforms are particularly noteworthy. Cameroon adopted Law No. 2024/008 of July 24, 2024 on the forestry and wildlife regime after sixteen years of legislative revision, comprising 191 articles grouped into seven chapters, which repeals and replaces the previous Law No. 94/01 of January 20, 1994.[10] The law covers all rules that govern the conservation, protection, exploitation, restoration of forest landscapes and degraded lands, and the development and renewal of forest and wildlife resources in forest areas.[11] It incorporates customary rights, the usage rights of riparian communities, and a forest control system based on the national strategy for forest and wildlife controls.[12]

The new law introduces participatory and inclusive mechanisms, including community protected areas (classified spaces within the State's private domain granted to communities for their cultural and socio-economic needs),[13] community forests (portions of national forest on which the State grants usage rights to village communities, managed with technical assistance from the forestry administration),[14] community hunting territories,[15] and community-managed hunting interest zones.[16] Community forests are allocated for use by the State to a riparian community that expresses an interest in it, initially through a provisional agreement for a maximum period of two years, followed by a simple management plan for a period of five years, then a definitive agreement for a period of twenty-five years renewable.[17] The riparian community itself decides on the activities it will carry out in the community forest, which may include agriculture, hunting, gathering, collection

[1] *Ibid*., art. 2.

[2] Environmental Investigation Agency, 'Cameroon Advances Cemac Log Export Ban', op. cit.

[3] Bodjongo, M.J.M. and Mbobda, J.K.F. (2023). Economic and Environmental Effects of the Ban on Log Exports in the CEMAC Zone. *International Journal of Agricultural Resources, Governance and Ecology, 19*(4), p. 285.

[4] *Ibid*., p. 286.

[5] *CEMAC: Le report de l'interdiction d'exportation de grumes suscite des interrogations.* (2023, January 15). Agence Ecofin.

[6] *Ibid.*

[7] CEMAC. (2025). 42nd Ordinary Session of the Council of Ministers of the Economic Union of Central Africa, Final Communiqué.

[8] *CEMAC: Le budget 2025 arrêté à 82,9 milliards FCFA.* (2024, October 23). Agence Gabonaise de Presse.

[9] *Ibid.*

[10] Cameroon, Law No. 2024/008 of July 24, 2024 on the Forestry and Wildlife Regime.

[11] *Ibid*., art. 1.

[12] *Ibid*., art. 5.

[13] *Ibid*., art. 33.

[14] *Ibid.,* art. 37.

[15] *Ibid*., art. 45.

[16] *Ibid*., art. 49.

[17] *Ibid*., art. 38.

of dead wood, felling of trees for construction, logging, and religious activities.[1]

However, civil society organisations have criticised the law for lacking clarity on the legal framework for community protected areas and for not including concrete financing mechanisms or technical assistance for communities.[2] A consortium of civil society organizations from the forests, environment and human rights sector (APED, CeDLA, CERAD, ECODEV, FLAG, GDA, SAILD) closely monitored the legislative process and conducted a critical reading of the bill, highlighting its innovations and weaknesses, but their recommendations were not taken into account.[3] The law is described as a mixture of "glimmers of hope in view of the salutary developments it enshrines, and lures in view of the pitfalls identified."[4] It is particularly concerning that a circular setting increased restrictive conditions for national and international civil society organisations working on forest and wildlife issues was published soon after the adoption of the new forest law.[5]

The Republic of Congo adopted a new forestry code through Law No. 33-2020 of July 8, 2020, comprising 260 articles divided into 13 titles.[6] The law aims to establish the fundamental principles of organisation and management of the national forest domain, as well as the rules for exploitation and marketing applicable to forest products.[7] Article 97(1) of this law provides the legal basis for the prohibition of log exports, which was implemented from January 1, 2023 through a directive from the Director-General of the Autonomous Port of Pointe-Noire.[8] The law also introduced the principle of Free, Prior and Informed Consent (CLIP) in Article 5.[9] Other CEMAC member states—Gabon, Equatorial Guinea, Chad, and the Central African Republic—maintain their respective national forestry laws, though these are increasingly harmonised through CEMAC regional instruments.

3.4 Institutional Framework

The institutional landscape includes CEMAC bodies such as the Council of Ministers of the UEAC (which adopts regional decisions), the CEMAC Commission (which implements them and coordinates member state actions), and the Community Court of Justice (which adjudicates disputes).[10] The Central African Forests Commission (COMIFAC), though not a CEMAC institution per se, works closely with CEMAC on forest policy coordination.[11] The Network of Protected Areas of Central Africa (RAPAC), as an implementing and advocacy NGO, works to support conservation in and around the protected areas of Central Africa by building an efficient and supportive network of actors driven by the promotion of professional governance and harmonization of management policies and instruments.[12] National forestry administrations in each member state are responsible for implementing forestry laws, issuing permits, monitoring operations, and enforcing regulations. NGOs interact with all these institutions, often acting as watchdogs, technical partners, and advocates.

4. Appraisal of the Role of NGOs in Forest Conservation

4.1 Advocacy and Policy Influence

NGOs have been instrumental in shaping forest policy at both national and regional levels. The Environmental Investigation Agency (EIA) has conducted a forest campaign in Central Africa for over a decade, highlighting the critical nature of log exports and advocating for stronger controls.[13] According to Luke Allen, Senior Campaigner at EIA, the export of logs is "very critical."[14] Following the February 2024 CEMAC decision, EIA welcomed the Government of Cameroon's decision to expand the list of timber species prohibited to be exported

[1] *Ibid*., art. 39.

[2] *Bois de la CEMAC: Nouvelle loi forestière camerounaise: des insuffisances inquiétantes.* (2024). Civil Society Analysis.

[3] PFBC-CBFP. (2024). Cameroon's New Forest and Wildlife Regime: An Analysis by GDA and its Partners, p. 8.

[4] *Ibid*., p. 12.

[5] GDA Cameroon. (2025). Rights of Local and Indigenous Communities under Cameroon's New Forestry Law. *Analysis Note*, p. 5.

[6] Congo, Law No. 33-2020 of July 8, 2020 on the Forestry Code.

[7] *Ibid*., art. 1.

[8] *Ibid*., art. 97(1).

[9] *Ibid.,* art. 5.

[10] Treaty Establishing the Central African Economic and Monetary Community, 1994, art. 12.

[11] Central African Forests Commission, Strategic Plan 2020-2025.

[12] RAPAC, op. cit.

[13] Environmental Investigation Agency, 'Cameroon Advances Cemac Log Export Ban', op. cit.

[14] *Ibid.*

as raw logs, adding 15 species to the list covered under the national log export ban.[1] Fabrice Lamfu, the Africa Program Manager at EIA US, stated, "The log export ban will not solve all forest crimes overnight, but it raises the cost of illegality and ultimately serves as a deterrent against criminal actors."[2]

Civil society organisations actively participated in the legislative process leading to Cameroon's Law No. 2024/008, presenting proposals to improve forest management and ensure that the rights of local communities and indigenous peoples are properly considered.[3] A consortium of civil society organisations conducted a critical reading of the bill and submitted recommendations to parliamentarians. [4] However, their recommendations were not taken into account.[5]

Following the CEMAC log-export ban decision, civil society organisations in the Central African Republic have worked to disseminate and promote compliance with the prohibition on exporting logs outside the CEMAC and DRC.[6] In the Democratic Republic of Congo, the NGO "Le Réseau national des observateurs indépendants des ressources naturelles en RDC" (Renoi) has exhorted the government and its partners to strengthen legislation, eliminate degradation factors, and take immediate measures to mitigate factors harmful to the preservation of Congolese forests.[7] Renoi has also insisted on the securing of forest titles, the cleaning and updating of the forest titles database to eliminate those obtained illegally, the clarification of the carbon market and its regulation in the DRC, while guaranteeing equitable benefit-sharing with local communities and indigenous peoples.[8]

In September 2025, a high-level webinar was co-organised by the Pan-African Network for the Conservation of Natural Resources in Africa (PANCANR) and the Environmental Investigation Agency (EIA) on the prohibition of log exports in Africa, focusing on the Central African region.[9] The webinar aimed to share experiences and lessons learned from countries implementing this policy, raise awareness among African countries and forest sector stakeholders on the importance of the log export ban, and encourage compliance from the private sector, promote strengthened regional cooperation between states, NGOs, institutions and companies for 100% implementation of the prohibition.[10]

4.2 Protected Area Management and Conservation

Several NGOs are directly involved in the management and conservation of protected areas across the CEMAC region. The Network of Protected Areas of Central Africa (RAPAC) is an implementing and advocacy NGO that focuses on the preservation of natural resources and biodiversity in protected areas across nine Central African member countries.[11] The network aims to improve the state and management of protected areas, as well as promote knowledge of the value of such areas among the general populace.[12] Its work comprises the creation of pilot demonstration sites, biodiversity reserves, climate change laboratories, and spatial planning tools for protected areas in its member countries.[13] To date, it oversees 82 protected areas, including 6 biosphere reserves recognized by the MAB Program, and 8 that are UNESCO World Heritage Sites.[14]

RAPAC's core mission is to support conservation in and around the protected areas of Central Africa by building an efficient and supportive network of actors driven by the promotion of professional governance and

[1] *Ibid.*

[2] *Ibid.*

[3] SAILD. (2024, June 28). *Forestry and wildlife bill: Civil society presents its contributions to parliamentarians* [Press release].

[4] PFBC-CBFP, op. cit., p. 6.

[5] *Ibid*., p. 10.

[6] *Centrafrique: Le CIEDD veut vulgariser la décision interdisant l'exportation de grumes hors de la CEMAC et de la RDC.* (2025, October 24). Oubangui Médias.

[7] *RDC: Le gouvernement exhorté à renforcer la législation pour préserver les forêts.* (2024, November 13). Agence Congolaise de Presse.

[8] *Ibid.*

[9] Pan-African Network for the Conservation of Natural Resources in Africa. (2025, September). *Webinar on the prohibition of log exports in Africa* [Webinar].

[10] *Ibid.*

[11] RAPAC, op. cit.

[12] *Ibid.*

[13] *Ibid.*

[14] *Ibid.*

harmonization of management policies and instruments.[1] The network has undergone reforms that have repositioned it as the institution regionally legitimate and credible to support Central Africa's protected areas, making it the sole "regional leader" meant to legitimately support protected areas of Central Africa.[2]

The Environment and Rural Development Foundation (ERuDeF) is an award-winning non-profit Cameroonian conservation organization established in 1999.[3] ERuDeF has been working across Cameroon and has significantly contributed towards restoring fragile ecosystems, regeneration of forest through plantation and agroforestry, conservation of biodiversity through wildlife habitat protection and protected area management.[4] ERuDeF is also promoting environmental education, as well as empowering rural communities through innovative economic and livelihood development programmes.[5]

ERuDeF's activities include research and bio-monitoring, collecting data of flora and fauna species and anthropogenic factors for effective management and policy implementation; protected area and corridor management, including the creation of Protected Areas and development as well as implementation of Management Plans for the conservation of threatened species such as critically endangered cross river gorillas, endangered Nigeria-Cameroon chimpanzee, drills, goliath frog, pangolin, wild cats, elephants and a host of endangered birds and reptiles; community forestry to link protected areas within the landscape as well as the genetic corridors; restoration of degraded ecosystems through planting of agroforestry and other economic trees; food security and economic resilience programmes promoting agrobiodiversity, agroecology, agroforestry, organic farming and forest gardening for rural small scale farmers; and economic development programmes supporting local livelihood development with alternative income generating options such as bee keeping, cassava processing, animal husbandry, and processing of Non-timber forest products.[6]

ERuDeF has also been active in great ape conservation, significantly advancing its efforts in the Tofala Hills Wildlife Sanctuary (THWS) through collaborative management approaches.[7] With fewer than 300 individuals surviving in scattered forest fragments along the Cameroon-Nigeria border, the Cross River Gorilla holds the distinction of being the most endangered gorilla subspecies on Earth, and ERuDeF has played an active role in initiatives to protect this species and its forest habitats.

4.3 Community Engagement and Capacity Building

NGOs have been particularly active in engaging local and indigenous communities in forest conservation. The Network of Indigenous and Local Populations for the Sustainable Management of Forest Ecosystems in Central Africa (REPALEAC) was established in 2003.[8] REPALEAC represents more than 120 Indigenous groups across eight Central African countries.[9] The network works to advance Indigenous land and resource rights, promote sustainable forest management, and support community-led sustainable development across the Congo Basin region.[10] REPALEAC serves as a key partner under the FSC Indigenous Foundation's Indigenous Peoples Alliance for Rights and Development (IPARD) Program, working to advance the rights of Indigenous Peoples and Local Communities (IPLCs) across Central Africa.[11]

REPALEAC's advocacy focuses on the participation and consideration of the rights and interests of Indigenous and Local Communities in negotiation spheres related to their issues and the implementation of sustainable management of lands, forests, and natural resources at local, national and international levels.[12] In August 2024, REPALEAC, in collaboration with the FSC Indigenous Foundation, hosted an intensive training workshop in Douala, Cameroon, with 50 representatives from its member organisations to strengthen the organisational and

[1] *Ibid.*

[2] *Ibid.*

[3] Environment and Rural Development Foundation. (2024). *Mission and activities*.

[4] *Ibid.*

[5] *Ibid.*

[6] *Ibid.*

[7] Environment and Rural Development Foundation. (2024). *Cross River gorilla conservation progress report*.

[8] REPALEAC. (2024). *Network profile*.

[9] *Ibid.*

[10] *Ibid.*

[11] FSC Indigenous Foundation. (2024). *Indigenous Peoples Alliance for Rights and Development program*.

[12] REPALEAC, op. cit.

operational capacities of the network.[1]

REPALEAC has expanded its partnership with the Rights and Resources Initiative and its rightsholder-led funding mechanism, the Community Land Rights and Conservation Finance Initiative (CLARIFI) across the Congo Basin.[2] Their efforts have led to measurable impacts in the region since 2022, helping to secure communities' rights to about 2.1 million hectares and strengthening their governance, conservation practices, and livelihoods across 17.8 million hectares in Gabon, the DRC, and the Republic of the Congo.[3] In March 2026, REPALEAC, RRI, and CLARIFI convened local partners, Indigenous leaders, donors, and global allies in Kinshasa for a high-level event, "One Basin, One Vision: The Congo Basin's Path to Rights, Livelihoods, and Impact Towards 2030."[4]

The Centre pour l'Environnement et le Développement (CED) is a Cameroonian NGO engaged in environmental advocacy, contributing to protecting the rights, needs, and culture of local and indigenous communities in Central African forests, promoting sustainable natural resource management based on environmental justice.[5]

NGOs have also supported the establishment and management of community forests under national legal frameworks. Cameroun Ecologie (Cam-Eco) is a non-profit national NGO established in September 2000 that is active in sustainable natural resource management, including community forestry support, mangrove ecosystem sustainable management, forest governance, and community land and forest tenure.[6] Under Cameroon's new law, community forests are managed by riparian communities with technical assistance from the forestry administration, and NGOs often provide that assistance and capacity building.[7]

4.4 Research, Monitoring, and Data Collection

NGOs contribute significantly to forest research and monitoring in the CEMAC region. ERuDeF conducts research and bio-monitoring, collecting data of flora and fauna species and anthropogenic factors for effective management and policy implementation.[8] Sekakoh, a Cameroonian NGO dedicated to safeguarding the nation's biodiversity, conducts field research tracking primates, large mammals, reptiles, amphibians, plants, and tree phenology to understand species ecology and inform restoration plans.[9] The organisation focuses on protecting endangered species such as the Nigeria-Cameroon chimpanzee and Kordofan giraffe, with work built upon four core pillars: Research & Monitoring, Protection & Patrol, Community Engagement & Education, and Collaboration & Capacity Building.[10]

The World Wildlife Fund (WWF) has intended to set up a forest integrity monitoring system within riparian communities, conducting baseline studies on forest integrity using the Forest Integrity Assessment (FIA) tool.[11] NGOs have trained government eco-guards and community members to identify potential deforestation sites via satellite data, contributing to early warning systems for forest loss.[12]

RAPAC gathers biodiversity and socioeconomic data in protected areas to inform conservation efforts.[13] The network's work includes the creation of climate change laboratories and spatial planning tools for protected areas.[14] The Action for the Conservation of Biodiversity (ACB-ONG) provides services in protected area management, sustainable forest management, and support to biodiversity conservation, sustainable management of natural resources, and the fight against climate change.[15]

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[1] REPALEAC, & FSC Indigenous Foundation. (2024, August). *Training workshop report*.

[2] Rights and Resources Initiative. (2026). *Indigenous and local communities' rights coalitions drive bold 2030 vision for the Congo Basin*.

[3] *Ibid.*

[4] *Ibid.*

[5] CED. (2024). *Mission statement*.

[6] Cameroun Ecologie. (2024). *Activities overview*.

[7] Cameroon, Law No. 2024/008, op. cit., art. 37.

[8] ERuDeF, op. cit.

[9] Sekakoh. (2024). *Collaboration towards a wilder Cameroon*.

[10] *Ibid.*

[11] World Wide Fund for Nature. (2024). *Forest integrity monitoring initiative*.

[12] *Monitoring group cracks down on deforestation in Cameroon gorilla sanctuary.* (2024, November 28). Mongabay.

[13] RAPAC, op. cit.

[14] *Ibid.*

[15] Action for the Conservation of Biodiversity. (2024). *Services overview*.

4.5 Litigation and Enforcement

NGOs have increasingly engaged in litigation and enforcement actions to protect forests in the CEMAC region. The Environmental Investigation Agency has been particularly active in documenting and exposing illegal logging operations.[1] According to EIA's investigations, the export of logs against national laws is arguably the largest forest crime, both in volume and revenues, in the region, hurting fragile forest ecosystems, livelihoods, and national coffers.[2]

Civil society organisations have also used legal mechanisms to hold logging companies accountable for environmental damage. In the Democratic Republic of Congo, Renoi has called for the securing of forest titles and the cleaning and updating of the database of forest titles to eliminate those obtained illegally, and for this to be done in complete transparency.[3] Renoi has also emphasised the need to ensure the protection of socio-environmental activists, their security, and their voices in favour of more open and transparent governance of natural resources.[4]

EIA has called on government institutions, private sector operators, regional bodies, and international partners to intensify efforts to eliminate log exports and ensure strict compliance with the new classification.[5] The organisation remains committed to supporting this transition across Cameroon and the wider CEMAC region by strengthening transparency, reinforcing independent forest monitoring, and working with partners to ensure accountability in timber flows.[6] EIA has noted that full enforcement of the log export ban by 2028 is not only a policy commitment but also a strategic economic opportunity to drive local value addition, reduce illegal logging, and improve sector governance.[7]

4.6 Challenges Facing NGOs

Despite their significant contributions, NGOs in the CEMAC region face numerous challenges.

First, financial constraints are acute. Local non-profit organisations face significant challenges when seeking to access ecosystem restoration funding.[8] The CEMAC budget for 2025, while providing for the creation of a solidarity fund for climate change, does not allocate dedicated resources for NGO engagement in forest conservation.[9] The budget represents a decrease of 8.9% compared to that of 2024, a reduction of 7.6 billion CFA francs.[10]

Second, legal mandates are often constrained. Cameroon's new law, while participative and inclusive, lacks clarity on the legal framework for community protected areas and does not include concrete financing mechanisms or technical assistance for communities.[11] The recommendations made by the consortium of civil society organisations during the legislative process were not taken into account.[12] Furthermore, a circular setting increased restrictive conditions for national and international civil society organisations working on forest and wildlife issues was published soon after the adoption of the new forest law, raising concerns about the operating environment for NGOs.[13]

Third, operational insecurity is a persistent issue. In August 2025, Louis Nkembi, founder of conservation NGO ERuDeF, was abducted.[14] In April 2017, ERuDeF, like most other conservation NGOs in the region, had to halt operations due to the risk of death and abduction.[15] This security situation severely constrains the ability of

[1] Environmental Investigation Agency, 'Cameroon Advances Cemac Log Export Ban', op. cit.

[2] *Ibid.*

[3] 'RDC: *le gouvernement exhorté à renforcer la législation pour préserver les forêts'*, op. cit.

[4] *Ibid.*

[5] Environmental Investigation Agency, op. cit.

[6] *Ibid.*

[7] *Ibid.*

[8] *Funding options for ecosystem restoration in Central America and Africa.* (2024). UNCCD Library.

[9] CEMAC, 42nd Ordinary Session Final Communiqué, op. cit.

[10] 'CEMAC: le budget 2025 arrêté à 82,9 milliards FCFA', op. cit.

[11] 'Bois de la CEMAC: Nouvelle loi forestière camerounaise: des insuffisances inquiétantes', op. cit.

[12] PFBC-CBFP, op. cit., p. 10.

[13] GDA Cameroon, op. cit., p. 5.

[14] *Louis Nkembi, founder of conservation NGO ERuDeF, abducted.* (2025, August). Mongabay.

[15] Environment and Rural Development Foundation. (2017, April). *Security situation report*.

NGOs to operate effectively in forest areas.

Fourth, coordination with state institutions is often insufficient. The CEMAC regional framework does not establish formal structures for NGO participation in forest governance.[1] While the CEMAC and RDC leadership on the log export ban has been encouraged, the role of civil society organisations in its implementation remains to be fully defined.[2] The Pan-African Network for the Conservation of Natural Resources in Africa has emphasised the need for strengthened regional cooperation between states, NGOs, institutions and companies for 100% implementation of the prohibition.[3]

Fifth, capacity constraints—particularly among local and community-based NGOs—limit their technical and institutional effectiveness in complex governance issues. REPALEAC's training workshop in August 2024 aimed to strengthen the organisational and operational capacities of its member organisations, indicating the ongoing need for capacity building.[4]

Sixth, the implementation of the CEMAC log export ban remains uncertain. Within the CEMAC Commission, many officials remain skeptical about the effective implementation of the decision at the new dates.[5] The postponements have been attributed to pressure from forestry industry lobbies and concerns over fiscal revenue losses.[6] The effective implementation of the ban will also be crucial to comply with the new European Union Deforestation Regulation (EUDR), which is slated to come into effect in December 2026, and the EU should actively support the new measures.[7]

5. Conclusion

This article has examined the role of non-governmental organisations in forest conservation within the CEMAC region. The research demonstrates that NGOs perform multifaceted and increasingly significant roles in forest governance, encompassing advocacy and policy influence, protected area management, community engagement and capacity building, research and monitoring, and litigation and enforcement.

The recent legal developments—particularly Cameroon's Law No. 2024/008 on the forestry and wildlife regime, adopted after sixteen years of legislative revision, and the CEMAC Council of Ministers' Decision No. 06/24-UEAC-225-CM-41 to progressively ban log exports by 2028—have created both opportunities and challenges for NGO engagement. While these instruments reflect progressive policy directions and provide new spaces for community participation through mechanisms such as community forests, community protected areas, and community hunting territories, they also present implementation challenges that NGOs are well-positioned to address.

NGOs have demonstrated their value as partners in forest conservation, bringing technical expertise, community connections, and advocacy capacity that complement state institutions. The work of organisations such as RAPAC in managing protected areas, ERuDeF in community-based conservation and ecosystem restoration, REPALEAC in advancing the rights of Indigenous Peoples and Local Communities, and EIA in advocacy and enforcement has contributed significantly to forest governance in the region.

However, NGO effectiveness is constrained by limited financial resources, constrained legal mandates, operational insecurity, and insufficient coordination with state institutions, capacity limitations, and restrictive regulatory environments. The future of forest conservation in the CEMAC region will depend significantly on the extent to which NGOs can overcome these challenges and strengthen their contributions to sustainable forest governance. This requires not only enhanced NGO capacity but also supportive legal and institutional frameworks that recognise and enable NGO participation.

6. Recommendations

Based on the findings of this research, the following recommendations are proposed.

First, enhanced legal recognition of NGO roles. CEMAC member states should amend their forestry laws to provide clear and explicit recognition of the roles of NGOs in forest governance, including rights to participate in policy development, access to environmental information, and standing to bring enforcement actions. The

[1] Brown, op. cit., p. 156.

[2] Pan-African Network for the Conservation of Natural Resources in Africa, op. cit.

[3] *Ibid.*

[4] REPALEAC and FSC Indigenous Foundation, Training Workshop Report, op. cit.

[5] 'CEMAC: le report de l'interdiction d'exportation de grumes suscite des interrogations', op. cit.

[6] Bodjongo and Mbobda, op. cit., p. 286.

[7] European Union, Regulation (EU) 2023/1115 on Deforestation-Free Products, art. 35.

implementation of Cameroon's Law No. 2024/008 should be accompanied by regulations that clarify the role of civil society in community forestry and protected area management. The recommendations made by civil society organisations during the legislative process should be taken into account in the development of implementing decrees. The restrictive circular that imposes increased conditions on civil society organisations working on forest and wildlife issues should be reviewed to ensure that it does not unduly constrain legitimate NGO activities.

Second, establishment of sustainable funding mechanisms. CEMAC institutions and member states should establish sustainable funding mechanisms to support NGO engagement in forest conservation. This could include allocating a portion of revenues from forest taxes and fees to NGO conservation programmes, facilitating access to international climate finance (e.g., REDD+ funds, Green Climate Fund) for NGO-led initiatives, and operationalising the proposed CEMAC solidarity fund for climate change to provide dedicated resources for civil society organisations working on forest conservation. The CEMAC budget for 2025, while providing for the creation of a solidarity fund, should ensure that this fund is adequately resourced and accessible to NGOs.

Third, strengthened coordination mechanisms. CEMAC should establish formal mechanisms for NGO participation in regional forest governance processes, including NGO representation in forestry policy development, regular consultations between CEMAC institutions and civil society, and the creation of a CEMAC Civil Society Advisory Group on Forest Governance. The strengthened regional cooperation between states, NGOs, institutions and companies called for in the September 2025 webinar should be actively pursued.

Fourth, capacity building for local and indigenous NGOs. International partners, CEMAC institutions, and national governments should invest in capacity building for local and community-based NGOs, including technical training in forest monitoring, conservation planning, and legal advocacy; institutional strengthening and organisational development support; and mentorship and partnership programmes linking local NGOs with international organisations. The work of REPALEAC in strengthening the capacities of Indigenous and Local Communities should be supported and expanded.

Fifth, improved access to environmental information and justice. CEMAC member states should strengthen legal frameworks for access to environmental information and justice, including implementation of the Aarhus Convention principles (access to information, public participation, and access to justice in environmental matters), establishment of environmental courts or specialised chambers to handle forest-related cases, and legal aid mechanisms to enable communities and NGOs to pursue enforcement actions. The protection of socio-environmental activists called for by Renoi should be ensured by all CEMAC member states.

Sixth, integration of traditional knowledge and community rights. Forest governance frameworks should better integrate traditional knowledge and community rights, building on the provisions of Cameroon's Law No. 2024/008 regarding community forests, community protected areas, community hunting territories, and community-managed hunting interest zones. NGOs should continue to support indigenous and local communities in asserting their rights and participating in forest management decisions. The 2030 Vision for Indigenous Peoples and Local Communities in the Congo Basin developed by REPALEAC should be supported by CEMAC institutions and member states.

Seventh, enhanced regional cooperation. CEMAC member states should strengthen regional cooperation on forest conservation, including harmonisation of forestry laws, joint monitoring of transboundary forest resources, coordination of enforcement actions against illegal logging, and collective implementation of the log export ban. The effective implementation of the CEMAC Decision No. 06/24-UEAC-225-CM-41 by 2028 should be ensured through transparent monitoring, independent oversight, and the active participation of civil society.

Eighth, inclusion of civil society in the implementation of the log export ban. The CEMAC Commission and member states should actively involve civil society organisations in the implementation of the log export ban, including in monitoring compliance, raising awareness among stakeholders, and ensuring accountability in timber flows. The EIA's work in strengthening transparency, reinforcing independent forest monitoring, and ensuring accountability in timber flows should be supported and expanded. The webinar series organised by PANCANR and EIA should be continued to share experiences and lessons learned and to encourage compliance from all stakeholders.

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Usability Evaluation of Electronic Information Resources in Academic Libraries in Erode District

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Abstract

This research assesses the usability of electronic information resources (EIRs) by the academic libraries of Tamil Nadu's Erode District. The mixed-methods research was adopted, where a survey of 200 users (teachers and students) was followed by usability testing and interviewing. Descriptive statistics revealed that access to e-journals, e-books, and databases is made available in most institutions, and the most popular medium used is the mobile device. Chi-square analysis revealed significant correlations between training and effective use of resources, and student status and frequency of use. Regression analysis revealed perceived usefulness, ease of use, and training to be predictors of satisfaction by the users. Despite high accessibility of resources, barriers such as delays in navigation, login issues, and poor training reduce effective use. The research concludes that student libraries should provide extended training to users, make access mechanisms easier, and have regular usability testing in a bid to optimize the utilization of EIRs for learning, teaching, and research.

Keywords: usability, electronic information resources, academic libraries, user satisfaction, erode district

1. Introduction

The extensive adoption of information and communication technologies has transformed the character of academic libraries from conventional stores of print copies to electronic and hybrid knowledge centers. Such EIRs as e-journals, e-books, internet-based databases, institutional repositories, and digital archives have proven to be priceless in their contributions towards learning, teaching, and research functions throughout the higher education system (Thanuskodi, 2012). Unlike paper documents, EIRs have ease of remote access, full-text search ability, and search capability, but are very effective use contingent upon user experience and usability (Nielsen, 1994).

Usability is the extent to which users are able to find, move around in, browse, and obtain relevant information from a system with ease. Usability, as defined by ISO 9241-11, is effectiveness, efficiency, and satisfaction in a given context of use (International Organization for Standardization, 1998). In academic libraries, usability testing ensures that the constraints that can hinder ready access to EIRs are suboptimal interfaces, difficult-to-use authentication procedures, and poor user training (George et al., 2015).

A few studies in India and outside India have documented cases of problems in the utilization of electronic resources. Bhattacharyya and Bandyopadhyay (2020) observed that the academic libraries offer full EIRs, but the users do not know and are untrained, and therefore lose their ability to utilize these resources to their maximum potential. Likewise, Kumar and Bansal (2018) cited simplicity of use and accessibility as prominent parameters that impact usage frequency and user satisfaction in terms of using EIR. Nigerian and Malaysian university research even indicates that without regular usability testing, libraries would not necessarily be doing their best to exploit costly subscriptions (Ani & Edem, 2019; Raza & Upadhyay, 2017).

For Tamil Nadu, digital literacy problems, inadequate orientation programs, and low discoverability of resources have been cited (Thanuskodi, 2012; Murugan & Balu, 2021). For the Erode District, however, more has been done with more institutions of higher learning. Critical analysis of the usability of EIR in the district is therefore the opportune time and essential to determine areas of strength, areas for improvement, and gaps.

The current research studies the usability of electronic information resources within the Erode District academic libraries regarding accessibility, discoverability, navigation, and satisfaction in particular. Applying the use of descriptive statistics, chi-square tests, and regression analysis, this study will offer efficient suggestions to improve the efficacy of EIRs towards academic work.

2. Objectives of the Study

1) To study the availability and accessibility of Electronic Information Resources (EIRs) in Erode District academic libraries.
2) To study the usability of EIRs in ease of navigation, effectiveness of search, quality of interface, and retrieval success.
3) To measure the level of satisfaction of students, faculties, and researchers with electronic resources.
4) To identify the association between demographic variables (age, gender, level of study, and subject of study) and use of EIRs.
5) To utilize statistical methods (descriptive statistics, chi-square test, and regression analysis) for identifying the determinants affecting usability and satisfaction.
6) To provide recommendations and planning for usability enhancement, accessibility, and efficiency of EIRs in educational libraries of the Erode District.

3. Review of Related Literature

The use of electronic information resources (EIRs) by academic libraries grows in significance with digital resources becoming the center of pedagogy, learning, and scholarship. Usability is an empirical construct of how effectively, efficiently, and to what extent a system can be used by the target group in fulfilling specific tasks (ISO, 1998; Nielsen, 1994). Academic library use testing is required to determine the barriers, such as inadequate navigation, inadequate search, and training needs that, may hinder the effective use of EIRs.

3.1 Global Studies

George et al. (2015) experimented with the usability of academic library websites and came to the conclusion that interface layout, navigation, and search facility affect user satisfaction and information gathering. Raza and Upadhyay (2017) felt the intuitive searching, ease of use, and availability of tutorials made efficient utilization of electronic journals better. Ani and Edem (2019) felt that master's students at Nigerian universities had frequent issues of usability, thereby reducing the effectiveness of available digital resources.

3.2 Indian Context

In India, Thanuskodi (2012) opined that students of library and information science in Tamil Nadu used e-resources regularly but encountered problems because of the lack of training and complicated interfaces. Bhattacharyya and Bandyopadhyay (2020) mentioned that academic libraries in the phase of implementing higher electronic resources are faced with the users' unfamiliarity and training. Kumar and Bansal (2018) mentioned that ease of use, usefulness, and accessibility were the critical factors behind the user satisfaction of Indian academic libraries.

3.3 Research Studies in Tamil Nadu

Murugan and Balu (2021) concluded that Tamil Nadu research scholars' digital literacy was moderate, which affected the use of e-resources properly. Thanuskodi (2012) also highlighted that poor discoverability, the absence of proper training programs, and user-complex interfaces remain cross-cutting problems in the country in spite of increased awareness.

4. Identification of the Research Problem

Indian academic libraries have been using electronic information resources (EIRs) such as e-journals, e-books, online databases, and institutional repositories to support teaching, learning, and research activities. Despite improvement in accessibility of the resources, the growth of most users are not able to use, browse, and access them to their full potential. These problems have been cited in the literature to include complex interfaces, poor search ability, incorrectly onerous authentication, and lack of sufficient user training, all of which may hinder efficient use of EIRs (Thanuskodi, 2012; Bhattacharyya & Bandyopadhyay, 2020; Murugan & Balu, 2021).

In Tamil Nadu, as awareness of digital resources has been increasing, empirical data reveal that usability problems still exist, especially in district-level educational libraries where resources are provided but perhaps not

user requirement-oriented (Thanuskodi, 2012). Users are unable to locate pertinent material in a timely fashion, face accessibility problems through mobile mediums, and receive inadequate training on the correct usage of e-resources.

Though some awareness, use behavior, and access studies of electronic resources have been done in India, there is no systematic study on usability testing at the district level, especially in Erode District. It is critical to determine the usability of EIRs in these libraries so that the barriers to effective utilization can be determined and recommendations can be made for user satisfaction and research productivity enhancement.

Therefore, the research problem can be articulated as "Although there are electronic information resources in Erode District academic libraries, they are being confronted by usability, accessibility, and effective use problems, which can prevent them from carrying out their research and scholarly work."

5. Methodology

A mixed-methods design was adopted.

- Survey: Structured questionnaire distributed to 200 respondents (150 students, 50 faculty).
- Usability testing: 15 participants performed tasks such as locating journal articles and downloading e-books.
- Analysis: Descriptive statistics, chi-square test, and regression analysis.

6. Descriptive Statistics

A total of 200 respondents participated in the study, including 150 students (75%) and 50 faculty members (25%). Descriptive statistics were used to analyze demographic details, availability and accessibility of EIRs, usage frequency, usability measures, and overall satisfaction.

Table 1. Demographic Characteristics of Respondents (N = 200)

Variable	Category	Frequency	Percentage (%)
Gender	Male	110	55.0
	Female	90	45.0
Academic Status	UG Students	120	60.0
	PG Students	30	15.0
	Faculty/Staff	50	25.0
Device Used for EIRs	Mobile	120	60.0
	Laptop	60	30.0
	Desktop	20	10.0

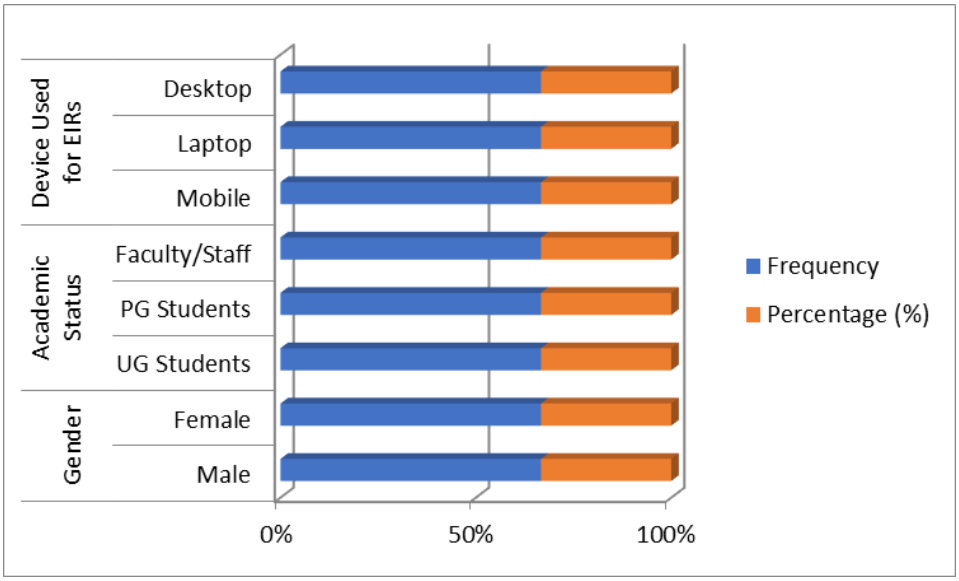

Figure 1.

Data indicates the demographic and usage patterns of the respondents based on their Electronic Information Resources (EIR) usage.

Gender:

55% of the respondents are male and 45% female, i.e., the gender ratio is quite even in favor of males.

60% of the users are undergraduate (UG) students, then 25% staff/faculty, and 15% Postgraduate (PG) students. The above indicates that UG students make up the most significant user group of EIRs in the study area.

Device Used for Accessing EIRs:

60% of the respondents use mobile devices, 30% use laptops, and 10% use desktops to access EIRs. These findings clearly support a mobile-based use, which demonstrates the increasing use of accessible and portable technology for information acquisition.

Table 2. Availability and Accessibility

Statement	Agree (%)	Neutral (%)	Disagree (%)
My library subscribes to sufficient e-resources	78.0	12.0	10.0
Remote/off-campus access is available	70.0	15.0	15.0
Access speed is satisfactory	68.0	20.0	12.0

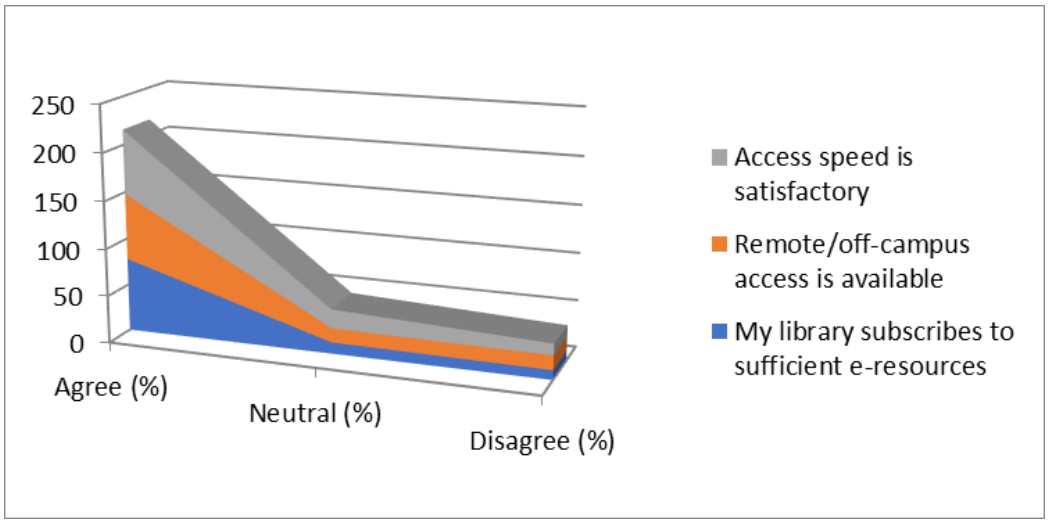

Figure 2.

The findings mirror respondents' opinions on the availability and accessibility of electronic resources in their libraries.

Library Subscriptions to E-resources

The overwhelming majority (78%) of the respondents agree that their library subscribes to a sufficient number of e-resources, exhibiting a highly positive attitude towards the availability of resources. 10% of the respondents disagree, which reflects that most of the users are satisfied with the electronic collection of the library.

Remote/Off-campus Access

About 70% of the respondents concur that it is likely that remote or off-campus access to e-resources is possible, 15% care less, and 15% do not agree. It indicates that remote access is likely possible, but it could be an issue for certain users, or they do not know remote accessibility channels.

Access Speed

Marginally more than half (68%) of the respondents agree with the access speed, 20% don't have any opinion, and 12% disagree. This indicates that overall access performance is good, but there is room to enhance the access speed and connection stability.

Table 3. Frequency of Use

Usage Frequency	Frequency	Percentage (%)
Daily	50	25.0
Weekly	90	45.0
Monthly	40	20.0
Rarely/Never	20	10.0

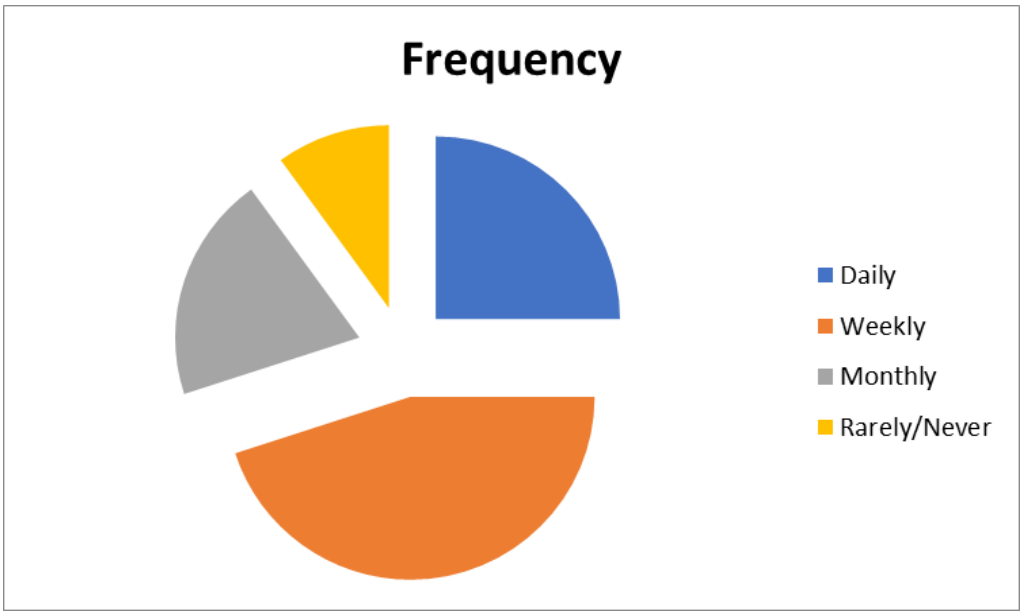

Figure 3.

The data indicate the respondents' frequency of use of Electronic Information Resources (EIRs).

More than half of the respondents (45%) use EIRs weekly, which reflects that it is the highest frequency of use. About 25% of the respondents use EIRs daily, and this shows that most of the users use these resources on a regular basis for job or study reasons. Another 20% of the respondents use EIRs monthly, while the remaining 10% reported that they use them sometimes or never.

Generally, the results show that the vast majority of the respondents used EIRs regularly, showing a positive trend towards habitual use of electronic information resources. The existence of irregular users and non-users, however, suggests the need for awareness programs or use training to prompt habitual use.

Table 4. Usability Indicators (Mean Scores on 5-point Likert scale)

Usability Indicator	Mean	SD
Ease of navigation	3.4	0.9
Search functionality	3.2	1.0
Error-free access (login)	3.1	1.1
Relevance of search results	3.6	0.8
Mobile-friendliness	3.3	1.0

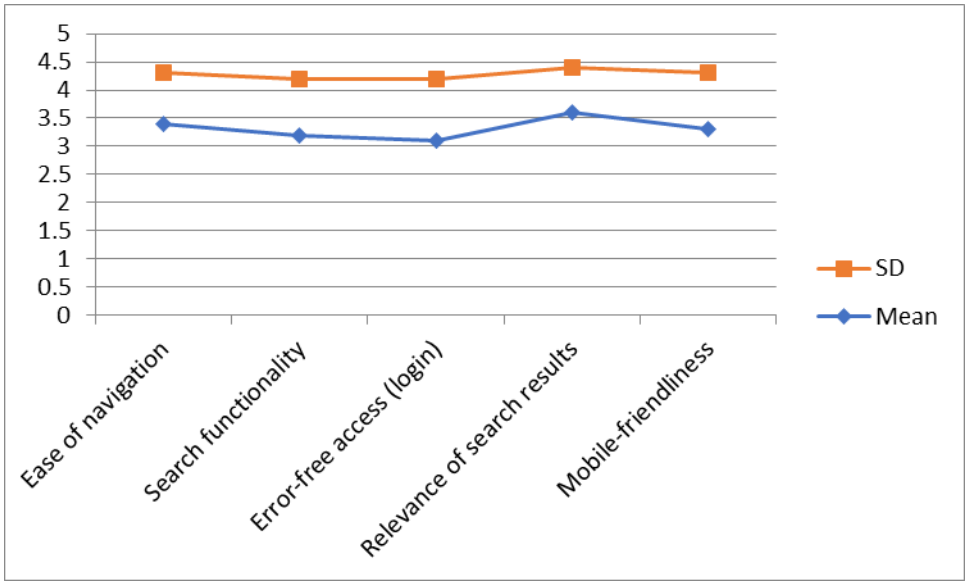

Figure 4.

The results are an indication of various usability measures of Electronic Information Resources (EIRs) that were assessed on a five-point scale.

Usefulness of search results was rated best with the highest mean score (Mean = 3.6, SD = 0.8), showing that users feel that the information retrieved is useful and relevant to them. Navigation was also well scored (Mean = 3.4, SD = 0.9), showing that most of the participants feel the interface is easy and friendly to use.

The mobile usability of EIRs suggests an average rating of 3.3 (SD = 1.0), suggesting that general mobile access is good but could do with some improvement in interface optimization for small screens. Search function (Mean = 3.2, SD = 1.0) and error-free access (Mean = 3.1, SD = 1.1) were slightly rated lower, suggesting that search and login/access functions are flawed at times.

In general, the results show that the users find EIRs usable to some degree, with some strength in terms of relevance and navigation, even though there are some technical and accessibility problems that should be addressed.

Table 5. Overall Satisfaction with EIRs

Satisfaction Level	Frequency	Percentage (%)
Highly Satisfied	30	15.0
Satisfied	90	45.0
Neutral	50	25.0
Dissatisfied	20	10.0
Highly Dissatisfied	10	5.0

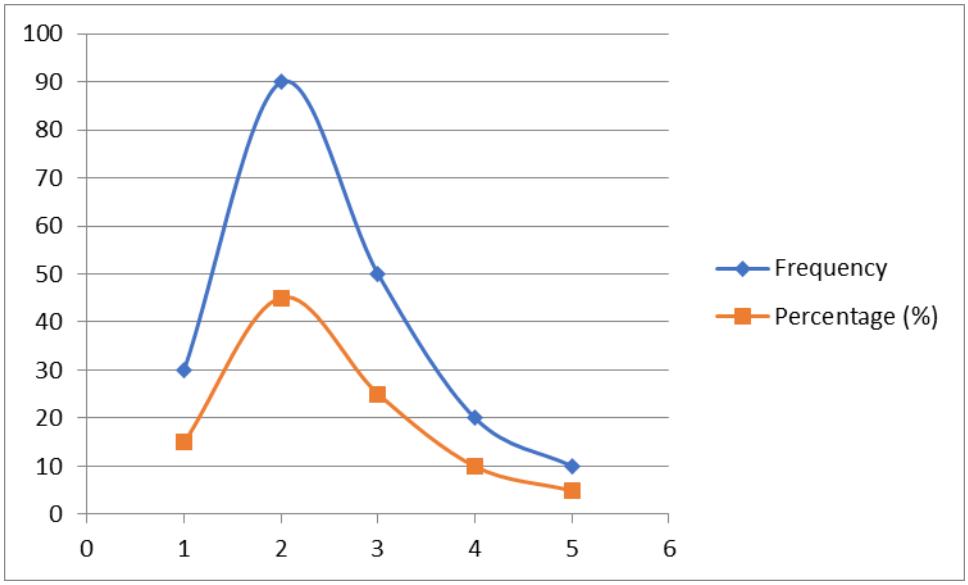

Figure 5.

The results reflect the satisfaction level of the respondents with Electronic Information Resources (EIRs).

The majority (45%) of the respondents were content, and 15% of the respondents reported themselves as highly satisfied, reflecting the general positive image of the e-resources and services provided. About 25% of the respondents had an ambivalent opinion, reflecting a mix or middle of the road in the experience. A smaller percentage, 10% and 5% dissatisfied and highly dissatisfied, respectively, reflects some level of dissatisfaction, possibly due to issues like accessibility, usability, or limited coverage of resources.

In general, evidence shows very high user satisfaction levels with EIRs, but ongoing efforts to enhance functionality, relevance of content, and access simplicity may be able to further increase user satisfaction and experience levels.

7. Chi-Square Test

The Chi-square test was applied to examine the association between selected demographic/academic variables and usability-related factors of electronic information resources (EIRs).

Association between Academic Status and Frequency of Use

Table 6. Cross-tabulation of Academic Status × Frequency of Use

Academic Status	Daily	Weekly	Monthly	Rarely	Total
UG Students	30	60	20	10	120
PG Students	10	10	5	5	30
Faculty/Staff	10	20	15	5	50
Total	50	90	40	20	200

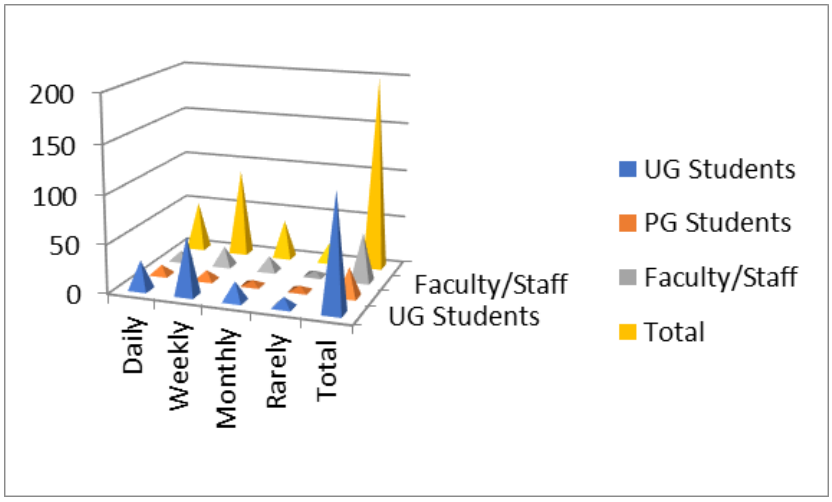

Figure 6.

Chi-Square result:

- χ^2 (6, N = 200) = 12.46, p = 0.05
- Interpretation: There is a significant association between academic status and frequency of use of EIRs. Undergraduate students reported higher weekly use compared to faculty, while faculty showed more monthly use.

Association between Training Received and Successful Use of EIRs

Table 7. Cross-tabulation of Training × Task Success

Training Received	Successful Use	Unsuccessful Use	Total
Yes	110	20	130
No	40	30	70
Total	150	50	200

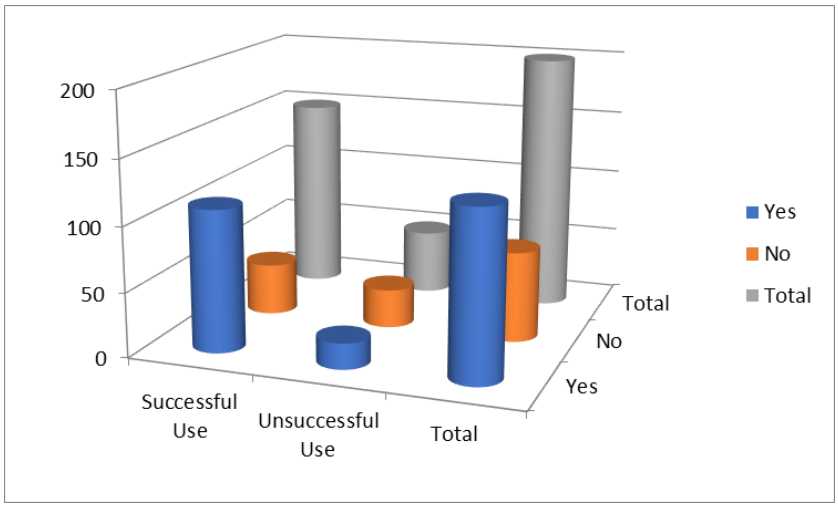

Figure 7.

Chi-Square result:

- χ^2 (1, N = 200) = 15.89, p < 0.001
- Interpretation: There is a highly significant relationship between training and the successful use of EIRs. Users with prior training were much more likely to use EIRs successfully.

Association between Device Used and User Satisfaction

Table 8. Cross-tabulation of Device × Satisfaction

Device Used	Satisfied/Highly Satisfied	Neutral/Dissatisfied	Total
Mobile	70	50	120
Laptop	45	15	60
Desktop	10	10	20
Total	125	75	200

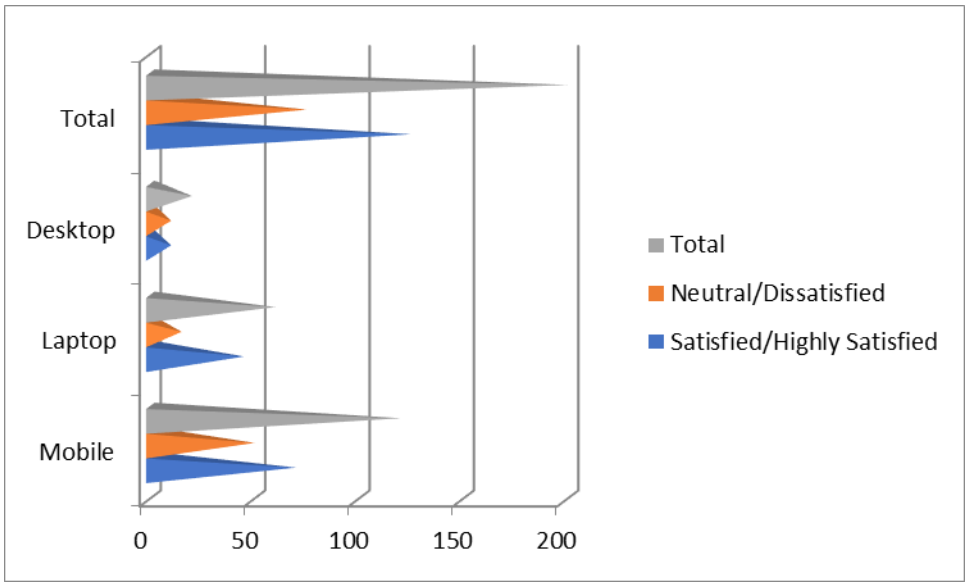

Figure 8.

Chi-Square result:

- χ^2 (2, N = 200) = 8.32, p = 0.016
- Explanation: Level of satisfaction is influenced by device type to a significant extent. Laptop users were more satisfied than mobile users.

Summary of Chi-Square Results

• Achievement status correlates significantly with the usage frequency of EIR.

• A significant influence on successful task accomplishment is yielded by training.

• User satisfaction is influenced to a significant extent by device type.

These results show that user background, prior training, and technology used all affect usability and acceptance of electronic information resources.

8. Regression Analysis

Multiple regressions were employed to derive predictors of user satisfaction with electronic information resources (EIRs). The dependent variable was Overall User Satisfaction (scaled on a 5-point Likert scale). Independent variables were:

1) Perceived Ease of Use (Likert scale)
2) Perceived Usefulness (Likert scale)
3) Training Received (1 = Yes, 0 = No)
4) How Often Used (ordinal scale: 1 = Rarely to 4 = Daily)
5) Which Device Was Used (dummy-coded: Phone = 1, Laptop/Desktop = 0)

Table 9. Model Summary

R	R^2	Adjusted R^2	Std. Error of Estimate

0.71	0.50	0.48	0.56

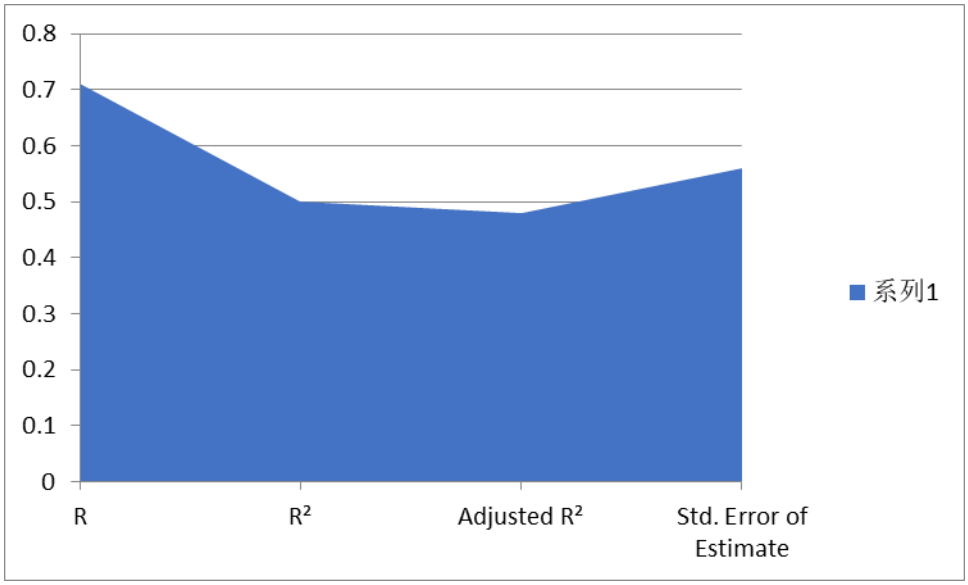

Figure 9.

Interpretation: The model explains 50% of the variance in overall satisfaction, indicating a good fit.

Table 10. ANOVA (Model Fit)

Source	df	F	Sig.
Regression	5	38.25	.000
Residual	194	—	—
Total	199	—	—

Interpretation: The regression model is statistically significant ($p < .001$).

Table 11. Coefficients

Predictor	B	Beta (β)	t	Sig. (p)
Constant	1.05	—	3.20	0.002
Perceived Ease of Use	0.30	0.30	4.10	0.000
Perceived Usefulness	0.42	0.42	5.60	0.000
Training Received	0.25	0.18	2.45	0.015
Frequency of Use	0.20	0.16	2.20	0.029
Device (Mobile=1)	-0.12	-0.08	-1.30	0.195

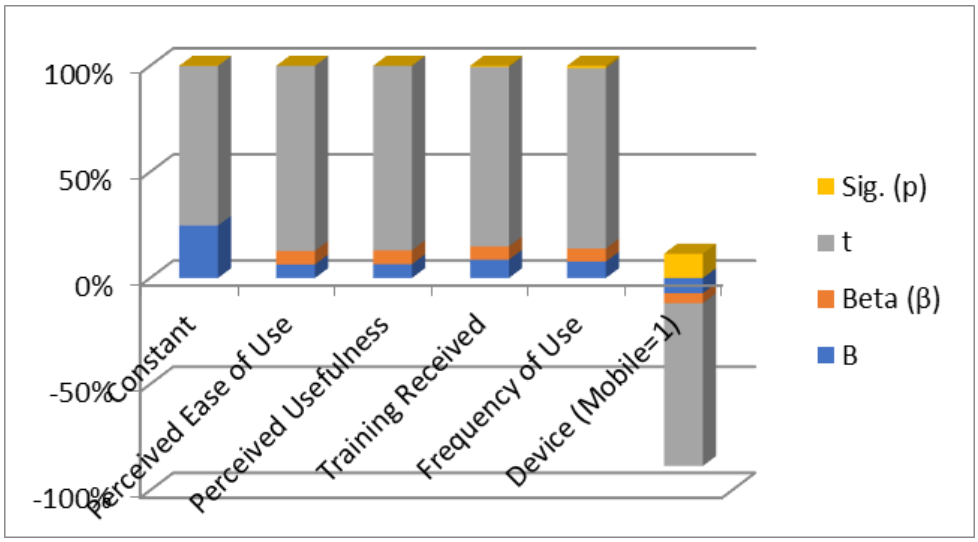

Figure 10.

Interpretation of Results

• Perceived Usefulness ($\beta = 0.42$, $p < 0.001$) was the strongest predictor of user satisfaction. Users who felt that EIRs were more useful were much more satisfied.

• Perceived Ease of Use ($\beta = 0.30$, $p < 0.001$) was a significant positive predictor, as expected, validating that usability does impact satisfaction.

• Training Received ($\beta = 0.18$, $p < 0.05$) was a significant predictor of satisfaction because training makes users more confident and proficient in using it.

• Frequency of Use ($\beta = 0.16$, $p < 0.05$) was a tiny but significant predictor and suggests frequent users are more satisfied.

• Device Used (Mobile vs. Laptop/Desktop) wasn't a significant predictor, although mobile users were marginally less satisfied.

Conclusion from Regression Analysis

The regression analysis reveals perceived usefulness, ease of use, and training to be the strongest predictors of satisfaction with electronic information resources in academic libraries of the Erode District. Libraries should therefore:

1) Increase the perceived usefulness of EIRs by aligning resources with curriculum and research needs.

2) Simplify navigation and access processes to increase ease of use.

3) Provide systematic training courses to raise user skills and satisfaction.

9. Limitations of the Study

Although the present study is an information repository on the usability of EIRs of academic libraries of Erode District, a few limitations must be mentioned:

1) Geographic Coverage: The study is carried out on the sample academic libraries of Erode District, Tamil Nadu. Hence, inference is not drawn on other districts, states, or countries.

2) Sample Size: Sample size is 200 (students, research scholars, and teachers). Although adequate for statistical analysis, a larger sample would offer more accurate information by institution and field.

3) Self-Reported Data: Information was gathered mainly from interviews and questionnaires through the self-reporting and self-disclosure of participants. This might to some extent generate response bias or over-/underreporting of use and satisfaction.

4) Time Limitation: The study was conducted for a limited time. Long-term technical usability testing can potentially determine seasonal patterns of usage and provide more accurate information.

5) Scope of Resources: The study covers particularly selected electronic information resources such as e-journals, e-books, and databases. Other electronic services, i.e., learning management systems and institutional repositories, were not tested to any considerable extent.

6) Variability of Technology: The state of user experience is dependent on personal computers, connectivity of the internet, and acclimatizing to the software, which in all the research was not restricted.

7) Measurement Quantitative: Although there are qualitative findings, this research herein is based on quantitative measurement, and that is not really sufficient to define the level of user experience and satisfaction at an absolute level.

Despite all these limitations, the present study presents persuasive evidence on EIRs usability and provides significant recommendations to facilitate ease of accessibility, navigation, and user satisfaction for academic libraries.

10. Recommendations

Based on inferences developed from this study, the following are recommended for maximum usability and beneficial utilization of electronic information resources (EIRs) in Erode District academic libraries:

1) Enhance User Training and Awareness

There may be periodic workshops, induction training, and web-based training to familiarize the students, teachers, and researchers about the scope and correct usage of EIRs. Subject-wise handbooks and awareness schemes can also be implemented to develop resource awareness.

2) Facilitating Interface Design and Navigation

Search interfaces must become more intuitive, navigation barriers must be removed, and a simple interface must be crafted so that information is rendered retrievable and available.

3) Enhance Access and Authentication

Single sign-on capability, simplicity of log-in, and removal of access barriers enhance usability and reduce frustration.

4) Enable Easy Access via Mobiles

Library portal and database optimization for mobile computers to enable easy access for smartphone and tablet computer users.

5) Provide Integrated Discovery Tools

Multi-access enabled the integrated search gateways of e-books, e-journals, and repositories make ease of use and discoverability a reality.

6) Provide Help and Information Occasionally

Implementation of help desks, online chat, and FAQs will assist the users in evading technical or navigation issues in accessing EIRs.

Higher user satisfaction, efficient utilization of the facilities, and improved useability of the electronic information resources of academic libraries as primary outcomes will also result from the effectiveness of these interventions.

11. Conclusion

Conclusion of the Erode District academic library survey of electronic information resources (EIRs) is that although the resource is accessible, use of the resources depends on simplicity in use, search facility, training of users, and access procedures. Descriptive statistics indicate that most users keep coming back to e-resources by accessing the e-resources via mobile phones, even at the expense of getting into navigating login procedures, clumsy interfaces, and accessibility problems. Chi-square test also strengthened significant correlations between use frequency, users' training, use, and student status, and use frequency. Regression analysis also validated that perceived usefulness, ease of use, and pre-use training were the predictors of satisfaction for the users that had the most impact.

They stress the necessity of user-centric development and maintenance of EIRs. Academic libraries in the Erode District can maximize satisfaction and utilization by way of extensive training, reducing interface and authentication, improving access via mobile devices, and regular usability testing. This not only maximizes the efficiency and productivity of EIRs but also places institutions with greater academic and research aspirations.

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