Becoming Open: Capacity Building and Community Collaboration in the Arab World through Open Science Principles

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Executive Summary

This white paper presents a revised framework for fostering open research and education models in the MENA region, aligning with the mission of the Forum for Open Research in MENA (FORM). It reinterprets the ERES Institute's New Age Cybernetics (NAC) concepts through the lens of Open Science, emphasizing accessibility, collaboration, and ethical data governance. The paper outlines how principles of distributed authority, merit-based participation, and sustainable resource management can contribute to building robust Open Science ecosystems, creating localized resources, encouraging community partnerships, and championing inclusive technological solutions across the Arab world.

I. Introduction: The Open Access Imperative and Strategic Vision for MENA

The global movement towards Open Science advocates for research that is transparent, accessible, and collaborative, aiming to accelerate discovery and enhance societal impact. In the MENA region, this imperative is particularly strong, given the need for inclusive knowledge sharing, capacity building, and sustainable development. The Forum for Open Research in MENA (FORM) plays a crucial role in facilitating this transition by empowering libraries, higher education institutions, research councils, and policymakers to embrace Open Science policies and practices [1].

This paper proposes a strategic integration of innovative cybernetic principles, originally conceived as

New Age Cybernetics (NAC), within the broader context of Open Science. We aim to demonstrate how concepts such as distributed governance, merit-based skill validation, and bio-ecologic resource management can be reframed to support the advancement of Open Science ecosystems in the Arab world.

II. The Open Science Framework: Core Principles and MENA Context

Open Science encompasses a broad range of practices designed to make scientific research and its dissemination accessible to all. Key pillars include:

- **Open Access:** Free online access to scholarly publications and research outputs.
- **Open Data:** Making research data openly available for reuse and verification.
- **Open Source Software:** Providing free access to software code for research and development.
- **Open Educational Resources (OER):** Freely accessible, openly licensed documents and media that are useful for teaching, learning, and assessing as well as for research purposes.
- **Citizen Science:** Public participation in scientific research.

In the MENA region, the adoption of Open Science principles can address several critical challenges, including fostering research collaboration across borders, enhancing the visibility of regional scholarship, and building local research capacities. FORM's mission directly supports these objectives by facilitating policy development and community building [1].

III. Reimagining Cybernetic Concepts for Open Science

The original ERES Institute proposal introduced several highly technical concepts under the umbrella of New Age Cybernetics (NAC). While the terminology is dense, the underlying principles of distributed systems, meritocracy, and sustainable resource management can be reinterpreted to align with Open Science goals. We propose a conceptual translation of these ideas:

A. Distributed Governance and Sociocratic Principles for Open Research Infrastructures

The original concept of "Sociocratic Overlay Metadata Tapestry (SOMT)" and "GAIA Consensus Matrix" can be re-envisioned as a framework for **distributed, community-governed Open Research Infrastructures**. Instead of centralized control, these infrastructures would be managed through consent-based decision-making processes, ensuring equitable participation from all stakeholders—researchers, librarians, policymakers, and the public. This aligns with FORM's goal to encourage collaborative community partnerships.

B. EarnedPath: Merit-Based Skill Validation for Open Science Capacity Building

The "EarnedPath Engine" and "Skill Node Completion" can be adapted to create a **merit-based system for Open Science capacity building**. This system would validate researchers' competencies in Open Science practices (e.g., data management, open publishing, use of open-source tools) through peer review and community-verified expertise, rather than traditional credentials alone. This directly supports FORM's pillar of localized capacity building and youth empowerment by providing alternative pathways for skill recognition and advancement.

C. Bio-Ecologic Economy: Sustainable Resource Management for Open Data and Digital Preservation

The "Bio-Ecologic Economy" and "GERP (Global/Spatial Resource Planning)" concepts, along with "P^3 (Personal, Public, Private - DeepSpace Resource Management)", can be translated into a framework for **sustainable resource management within Open Science**. This involves developing environmentally conscious strategies for managing and preserving open data, digital repositories, and computational resources. The focus on resource efficiency and collective ownership can inform the development of shared, sustainable digital infrastructures for research outputs in the MENA region, aligning with the long-term vision for accessible and inclusive research.

D. Inclusive Technologies: Hands-Free Navigation and Universal Access

The original paper's emphasis on "HFVN (Hands-Free Voice Navigation)" and "VERTECA hands-free navigation" highlights the importance of **inclusive access to Open Science platforms**. This can be reinterpreted as a commitment to developing user-friendly, accessible interfaces for Open Access repositories, data platforms, and educational resources, ensuring that language barriers or physical abilities do not hinder participation in the Open Science ecosystem. This supports FORM's goal of creating accessible and localized resources.

IV. Application to the MENA Region: Opportunities and Policy Recommendations

The MENA region presents unique opportunities for the adoption and advancement of Open Science. The cultural emphasis on consultation (shura) and community collaboration aligns well with the participatory nature of Open Science. By leveraging these cultural strengths, the region can build a vibrant and inclusive research landscape.

A. Policy Recommendations for Advancing Open Science in MENA

To effectively implement these reimagined principles, we propose the following policy recommendations for stakeholders in the MENA region:

1. **National Open Science Strategies:** Governments and research councils should develop comprehensive national strategies for Open Science, including mandates for Open Access publishing and Open Data sharing.
2. **Capacity Building Programs:** Universities and research institutions should invest in training programs for researchers, librarians, and students on Open Science practices, data management, and the use of open-source tools.
3. **Open Infrastructure Development:** Support the development and maintenance of open, interoperable digital infrastructures for repositories, data archives, and computational resources, potentially leveraging regional partnerships.
4. **Incentives and Recognition:** Establish incentive structures that recognize and reward researchers for engaging in Open Science practices, such as open peer review, data sharing, and pre-registration.
5. **Ethical Guidelines:** Develop clear ethical guidelines for data sharing, privacy, and the responsible use of emerging technologies in research, particularly concerning sensitive data and cultural heritage.
6. **RTL Functionality:** Prioritize the development and integration of Right-to-Left (RTL) functionality in all Open Science platforms and tools to ensure full accessibility and usability for Arabic-speaking researchers.

B. Addressing Ethical Considerations

The original paper's mention of advanced biometric verification and brain-computer interfaces (e.g., Neuralink-like systems) raises significant ethical concerns regarding privacy, data security, and potential misuse. While these technologies are speculative in the context of immediate Open Science implementation, any future integration must be guided by robust ethical frameworks, informed consent, and strict data governance protocols. The focus should remain on technologies that enhance accessibility and collaboration without compromising individual rights or autonomy.

V. Conclusion: Towards an Open and Collaborative Future for MENA Research

The Forum for Open Research in MENA is at the forefront of a transformative movement. By strategically reinterpreting innovative cybernetic concepts through the lens of Open Science, this white paper provides a pathway for building robust, inclusive, and sustainable

research and education ecosystems in the Arab world. The emphasis on distributed governance, merit-based capacity building, sustainable resource management, and inclusive technologies offers a vision where knowledge is freely accessible, research is collaborative, and the MENA region stands as a leader in the global Open Science movement.

References

[1] Forum for Open Research in MENA. *About FORM*. Available at: https://forumforopenresearch.com/about-form/