

## Science in the Arab World: Vision of Glories Beyond

Wasim Maziak

Of all its accomplishments, the West is perhaps most proud of its scientific revolution, which has been unfolding for the past half-millennium. Only students of history remain consistently mindful of the pivotal and catalytic role that the Arab world played in the early phases of this revolution. Now, all of us should have a vested interest in advancing science and technology in the Arab community. Science and technology provide the means to feed people, improve their health, and create wealth. They can help to reduce societal tensions and build international bridges for badly needed dialogue and mutual understanding. To usher science and technology more thoroughly into Arab culture and society, however, the West needs to acknowledge the Arab world's historical contributions, and the Arab world needs to stop dwelling on its golden past by also embracing lessons about science and technology that the West learned long ago.

In medieval Europe, where the Christian dogma that the world unfolded according to a divinely predetermined plan prevailed, there was little space for those willing and eager to understand nature in order to use it for their own benefit. Beginning in the 11th century, the ailing Arab provinces in Spain (Al-Andalus) were falling to European armies, and with them came priceless spoils that

changed the world: the epic intellectual achievement of Arab-Islamic scholars since the 8th century. Flourishing libraries in cities like Toledo and Cordoba contained thousands of books on every field of knowledge. Unlike the Moguls, who in the 13th century destroyed Baghdad and its libraries, thereby abruptly ending the golden era of the Arab-Islamic civilization, the Europeans were quick to realize the value of these windfalls of knowledge.

During the Abbasid reign (750 to 1258), learning in Islam was encouraged in every field of knowledge, and scholars of every color and creed traveled to Damascus and Baghdad to study and work. In these tolerant times, Islam's leaders encouraged learning and the use of reason to understand nature. The early Abbasid Caliphs—most notably Al-Mansur, Harun Al-Rachid, and Al Ma'mun, who reigned from 754 to 833—embraced science as a state's defining policy, ushering in a golden era of Arab-Islamic civilization. An avid movement of translation and studying of ancient books and of advancing new knowledge ensued on an unprecedented scale. Arab and Muslim scholars scored achievements in every field of science: mathematics, astronomy, medicine, optics, and philosophy. Al Razi's (Rhazes) and Al-Khwarizmi's seminal work in the 9th and 10th centuries laid the foundation for modern



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clinical medicine and mathematics (the word “algorithm” derives from the name Al Khwarizmi). This thirst for knowledge was soon transferred to other parts of the Islamic empire, and Al-Andalus soon competed with Baghdad as the cultural hub for Arabs and Muslims.

Of equal importance to the influence of the Arab-Islamic scientific discoveries on the European Renaissance was the reintroduction of ancient Greece's natural philosophy to medieval Europe by way of translations by Islamic scholars. The historian James Burke identifies several knowledge shocks that ignited the Renaissance. One was delivered by Ibn-Sina (Avicenna, 980 to 1037), whose *Kitab Al-Shifa* (“The Book of Healing”) introduced medieval Europe to the principles of logic and their use to gain knowledge, and placed science and religion on equal terms as sources of knowledge and understanding of the universe. Another major shock was delivered by Ibn-Rushd\* (Averroes, 1126 to 1198), whose writings and commentaries reintroduced to medieval Europe the Aristotelian approach to studying nature by observation and reasoning.

From that point on, the scientific paradigm of knowledge production advanced relentlessly throughout Europe. At the same time, the Arab-Islamic civilization and its contributions to science and knowledge started its long decline with Ibn-Khaldun (1332 to 1395), who established in his



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“Muqaddamah” the basic tenets of modern sociology, being the last prominent Arab thinker of the era. Moreover, this descent was accompanied by a major shift in the dominant thought paradigms in Arab-Islamic contexts, from the rational and tolerant to a more conservative school of thinking that denounced philosophy and rationalism. This conservative, indoctrinated view of the world continues to be influential today with no real challenge to it other than that of the reformists of the 19th and early 20th centuries, such as Jamal Eddin Al-Afghani and Muhammed Abduh.<sup>†</sup> Both scholars explicitly opposed Western colonialism, but they embraced rationalism and sought to reconcile Islamic principles with those of modernism.



**Arab seed of science.** Ibn-Rushd (Averroes, 1126 to 1198) helped to open new ways of thinking by attempting to overcome the contradictions between Aristotelian philosophy and revealed religion by distinguishing between two separate systems of truth—a scientific body of truths based on reason and a religious body of truths based on revelation.

### The Decline of Science in the Arab World

Currently, the scientific output of Arabs is disproportionate to their human and economic capacities. Taking biomedical research as an example, Arab countries currently produce less than 1% of citations in the world and contribute less than 0.5% of papers appearing in the 200 leading medical journals.<sup>‡</sup> Annual spending on research and development in Arab countries is estimated at 0.15% of their gross domestic product (GDP), compared to a world average of 1.4%.<sup>§</sup> Lack of funding, poor institutional support, and meager integration within the international scientific community are among the many reasons that analysts have cited to explain the current status of science in Arab states. More general factors, such as wars, conflicts, and international political and economic sanctions, also have been implicated.

These undoubtedly are important factors, but they do not include the more fundamental roots of science's current situation in the Arab world. For example, countries enjoying relatively long periods of stability and affluence (most of the Gulf States) do not fare better in terms of biomedical research, especially when the large number of foreign scientists working there is taken into consideration. On the other hand, countries like Lebanon and Jordan, which suffered from long internal strife and poverty, fare better than other Arab states when their scientific production is weighed against their GDP.<sup>||</sup> This suggests that less obvious factors are playing decisive roles in the valuation of science in Arab societies.

Even as most poor Arab states viewed science as a luxury that they could not afford, wealthy Arab states perpetrated an illusory adoption of science and technology. Rich Arabs believed that oil money plus Western technology was a simple formula for industrialization and modernization. Thus, acquiring the latest technological products or shares in hi-tech industries became synonymous with being partners in the technological revolution of the modern world. After all, most Arabs view science as a commodity that can be separated from the thought processes and sociocultural attributes of its producers.

This perspective makes it hard to appreciate the differences in culture and values between technology-producing and technology-consuming societies.

At the same time, the “West” was doing its part to solidify this schism by treating Arabs as a mere market sector rife with insatiable consumers that it had to appease, but without any commitment to developing this sector's own science and technology capacities. This view resulted in a business-type alliance with contractual commerce, but no real dialogue beyond that. For a while, this state of affairs seemed to suit both sides, but the rapidly advancing information-communication technology disrupted the quietude. But who among us could have foreseen the profound impact of these technological developments on nearly all aspects of life of nearly every society a decade or two ago?

Perhaps more than anyone, those in traditional Islamic societies felt the shock: The proliferation and expansion of information technologies brought a ruthless invasion of Western culture into virtually every sphere of life. With satellite TV, the Internet, and electronic communication, Western lifestyles, fashion, behavior, and values infiltrated Arab homes with no real way to keep this influx in check. I suspect that this unsolicited invasion of Western culture and values has been felt more directly by Arabs today than by their grandfathers in the 19th and early 20th centuries, who faced European armies occupying their homelands.

Arabs were awakened to the fact

that the arrival of innovations brings with it, directly or indirectly, the lifestyle and socio-cultural values of their innovators. Wealth, it seems, is powerless against the culture of those who create and own the technology. For most Arab societies today, the tides of inputs coming from all directions—from their conflict-ridden present, from the unjust distribution of wealth, and from their tyrant-controlled regimes that tolerate no dissent—have been confusing, relentless, and exhausting. The resulting frustration has been channeled outward toward the West in the form of disdain and hostility, and inward in the form of an antagonistic view of the world.

In this conflicted sociological and emotional context, there has been little space in the Arab mind to distinguish between market dynamics, politics, and nations, to perceive the valuable discourse and diversity within Western societies, or to appreciate the moral values and work ethics of Western culture. Instead, the entirety of the West has been gradually demonized. And by linking modern Western culture to the period of the Crusades, many Arab opinion-makers forged a historical basis for this vilification as an uninterrupted continuation of the evils of the past (arguably many people in the West, especially after 9/11, have adopted a similar mind-set toward Arabs and Muslims). From a psychological standpoint, such an attitude is understandable. As a proud people, Arabs turned to their golden past for a refuge, and as a threatened culture, they turned to their native thought system (Islam) for answers. More than that, however, this reaction has proceeded to the point where the past has become



**Renaissance maker.** In this manuscript illumination, the Arab scientist and philosopher Ibn-Sina (Avicenna, 980 to 1037) converses with others in a pharmacy. His “Al Qanun of Medicine” served as the standard medical text in Europe for seven centuries, and he also laid some groundwork for the European Renaissance by advocating the use of reason and logic as the way to gain knowledge.

distilled and purified, and Islamic teachings have been selectively used to embrace and abet the emerging anti-Western sentiment.

With little reason for pride or celebration, Arabs leaned toward trivializing mortal earthly life, choosing instead to reassess the main purpose of existence as ensuring heavenly immortality. A logical extension of this existential reevaluation has been to view the West's interest in science as an improper indulgence in material trivialities. For decades, these changes were proliferating and festering under the surface, creating an atmosphere inimical to science and one effectively closed to the possibility of learning from the Western experience.

Science was caught in the cross-fire. Subconsciously for many Arabs, modern science's ties to the West, to rationalism, and to natural materialism gave it the flavor of enmity. And because science cannot be practiced nowadays without close collaboration with Western academic institutions, research has become, in the minds of many Arabs, a suspicious activity and yet another potential gateway for Western incursion.

As a result, the pathway to the future shifted from one involving science to one based on the return to true Islam. Left unanswered in this choice was what a shunning of science would entail and how to face the challenges of the inevitable technology gap that would come with the choice. On the other side of the equation, the main competing view to the Islamic one in Arab countries today, the liberal-democratic paradigm, focuses mainly on political structure and is equally ambivalent about the centrality of science as a driving force for development. With the scientific community being all but mute, science in the Arab world has currently no one to speak on its behalf, and it occupies an insignificant niche. Moreover, its approach to understanding and investigating nature, as well as its own history, attracts virtually zero interest.

### Reawakening of Arab Science

Science thrives on freedom of inquiry and unfettered flow of information. Most Arab societies are run by dictatorships that practice different levels of censorship on their citizens, leading to a weakening of democratic institutions. Such institutions are vital for the development of science by unlocking the diversity within the society, making it less prone to quietly adopt rigid dogmas and doctrines, advocating the importance of science and freedom of inquiry, and shielding scientists from social and political pressures against research dealing with sensitive social and cultural issues, such as the influence of polygamy on the physical and mental health of women.<sup>†</sup> If they were

in place, functional democratic institutions also would make it more difficult for rulers to spend most of the national income on arms while other areas, including science, suffer greatly from the lack of funding.

Most higher scientific institutions in Arab countries are run by governments, which, in undemocratic systems, means that their goals actually are more political than scientific. This mode of governance reflects unfavorably on many aspects of academic life, rendering sci-

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entific merit and research of little importance for career advancement and precluding any genuine evaluation of the scientific performance of these institutions. Lack of high-quality research by faculty members, in turn, limits training opportunities for students and hinders the development of the very organizational structures that would support the growth of research capacity. This has turned most Arab universities merely into centers for knowledge dissemination, not for questioning, criticism, and an authentic search for new knowledge.

To allow research and science to take off once again in Arabic countries, universities and academic institutions need to be redefined as centers for both the dissemination and generation of knowledge, and research funding needs to be allotted according to proper evaluation mechanisms.

But what are the prospects for Arabs in today's science landscape? The same information revolution that has been perceived by so many Arabs as threatening also presents an unprecedented opportunity for every nation in the world to close the science and technology gap. Every society now has the means to build its own science and technology capacities and in ways that do not necessarily follow the path of the West's scientific revolution. Such a prospect should make it easier for Eastern cultures to build their science base, and indeed, many nations in Asia are doing just that without much concern about the loss of their cultural identity or moral values.

But for Arabs, there is a sizable price to pay for being able to instantly know the weather forecast in remote areas or to gather 100 opinions on any topic with little more than a few keystrokes. After all, this technology is forging its own global culture with mainly Western influences. To buy into it as a non-Westerner, therefore, is to personally accept a nonleading

role in the cross-national cultural arena. This is not to say that there is a master Western mind at the controls in some global information-communication headquarters. The global arena is open to everybody, and the more a nation is advanced technologically and open to new ideas, the more it is likely to contribute to, and influence, this emerging global culture. The dilemma for Arabs today comes down to choosing between self-exile from the global community for the sake of preserving cultural

identity, or contributing one's own identity to a global culture with no specific or chosen color, religion, or ideology. Were Arabs to take the leap into this new global context, it may not be a farfetched prediction that the center of influence of this culture might start to shift to the East within a few decades.

A moment of opportunity is at hand. The Arab world needs to reopen its collective mind to the West, by acknowledging the West's contribution of modern science to the world. At the same time, the West should recognize the Arabic contribution to the scientific revolution without downplaying the role that Islam has played. Real pride of the golden past of Arabs means extracting the right lessons from it: adoption of science by the state, encouragement of free scientific inquiry, promotion of science among the masses, and most importantly, embracing the scientific accomplishments of other cultures without fear or prejudice. Certainly, the highest standard of piety should become once again the individual's contribution to the welfare of his society, and the greatest sin, the acceptance of a continuing and avoidable backwardness and dependence.

### References and Notes

- \*During the Renaissance, Ibn-Rushd was often referred to as the "The Commentator," in comparison to Aristotle "The Philosopher," signifying his status and contribution.
- †On his return from a journey to Europe, Sheikh Muhammad Abduh, signifying the precedence of deeds over rituals in the Islamic context, said, "In Europe I found Islam but not Muslims. Here in the East, I find Muslims but not Islam."
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