

Rise and Fall of Knowledge Power: An In-depth Investigation

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Abstract

Knowledge falls short of expressing all the aspects of 'ilm. Knowledge in the Western world means information about something, divine or corporeal, while 'ilm is an all-embracing term covering theory, action and education. It may be said that Islam is the path of "knowledge." No other religion or ideology has so much emphasized the importance of 'ilm. There have been many discussions in the media and newspaper about the wonders of the golden age of Islam. The Muslim World held knowledge power for over five hundred years. They dominated in the field of historiography, religious texts, medicine, astronomy, mathematics, sciences, literature, geography and travel and many other areas during 750-950AD in the world history. But the current Muslim World is far behind in knowledge power than the rest of the world despite holding vast sources of economic resources. How Muslim knowledge powers became great and how they declined, is a question before today's researchers. Knowledge power is a much softer type of power, if anything; it forms one of the major foundation stones for great power. In this study, we explore the phenomenon and several factors responsible for the fall of Muslims' knowledge power. However, given the long and varied human history of knowledge and scientific discovery, if Islamic countries want to become knowledge power, Islamic countries should make a realistic action plan for human resources development. In the present study, we also explore the scope of initiative to power the knowledge economy in order to restore the flagging of knowledge powers.

1. Introduction

We learn from history that the early Muslims were conscientious of their mission in life. Their personal and collective life were moulded according to Islamic principles and gained such knowledge which enabled them to become exemplary witnesses of Islam before the world. First generation of Muslims, in particular established a strong attachment with Al-Qur'an from which Muslims drew inspiration, motivation. People of different races and religious beliefs lived together in society in peace and harmony. People were free to travel, live, trade and set up business anywhere in Islamic world. Societies during that time made great progress in science, technology, mathematics, medicine, philosophy, law, jurisprudence and other fields of knowledge. Islamic World became the centre

of knowledge power through making great inventions and discoveries. Present modern technological and social developments have actually evolved from the contributions made by a number of earlier Islamic intellectuals (750AD-1150AD) during Muslim rule. Historian Watt (1972) writes: "We sometimes belittle the extent and importance of the Islamic influence in our heritage, and sometimes overlook it altogether. We must acknowledge our indebtedness to the full. To try to cover it over and deny it is a mark of false pride (p. 1-2)."

Knowledge power is a much softer type of power, if anything; it forms one of the major foundation stones for a great power. How countries and nations become knowledge powers and how they lose their lead? Paul Kennedy explained in his book, "The Rise and Fall of Great Powers" how great powers became great and how they fell. Amongst other reasons it was because of an imperial overstretch, the inability to sustain the military strength by their economies. It is observed that history is a vast early warning system. Patterns swirl around in history and so many times, we see the same pattern re-emerging over and over again. Such is the case with 'Knowledge Powers'.

What is a knowledge power? Before going to discuss about the "knowledge power", we should define what knowledge is! Knowledge falls short of expressing all the aspects of 'ilm in Islamic term. There is no economic development without 'ilm. The latter cannot take place without knowledge or education (Ramadan, 2001). Knowledge in the Western world means information about something, divine or corporeal, which 'ilm is an all-embracing term covering theory, action and education. It may be said that Islam is the path of "knowledge." No other religion or ideology has so much emphasized the importance of 'ilm. The Qur'an emphasizes that one should pursue only that aim of which he has a definite and clear knowledge. In the words of the Holy Qu'ran, Prophet Muhammad (peace be upon him) followed, was "To recite His verses to them, to help their development and to teach them the Book and the way thereof", (Al-Quran 62:2). Prophet Muhammad (peace be upon him) offered to the people the pure knowledge that he received by Revelation from God. His appeal was based on reason. "I call to God with sure knowledge. I and whoever follows me", (Al-Qur'an 12:108).

Historically speaking, economies start by taking stock of material things: land and resources. Whoever controls land and resources has the power. But before long, energy enters the scene. What's the use of owning land and resources if we don't have the energy (the muscle, wind, wood, or oil power) to do things with them? In the Industrial Age, whoever controls the energy wields the power. Yet using energy to manipulate matter takes knowledge-the more the better. Mind-power replaces muscle-power. As knowledge increases, we use matter and energy more efficiently. We do more with less. That is what made the Information Age

so popular: with information, we can do almost anything. At this stage, "knowledge is power". And it is not scarce. Knowledge tends to breed more knowledge. The amount of knowledge produced by a country or nation is the absolute factor, while comparing this amount to other countries/nations is the relative factor. Our discussion of knowledge power will be a very broad based definition, spanning both arts and sciences - all the 'ologies, physics, chemistry, engineering, mathematics, medicine, painting, sculpture, architecture etc. The objectives of this study are:

- (1) To explore phenomenon and reasons- why knowledge power rise and fall, and
- (2) To explore how the Islamic countries can become knowledge power in order to restore its flagging power.

This study is divided into seven sections. Section one is an introduction. Section Two gives a brief history of knowledge powers held by different countries. Section Three makes an attempt to identify the factors behind Islamic World's knowledge power held in the past and section Four discusses in brief about the contribution of Muslims in the knowledge field. Section Five discusses the factors behind the fall of Muslims' knowledge power. Section Six explores the scope of initiative in the Islamic World to power the knowledge economy in order to restore the flagging of knowledge powers.

2. History of Knowledge Power of Nation/States at a Glance

When we read about the way of measurement of knowledge both qualitatively and quantitatively, the points usually look at the number of patents issued to the number of books published in the different fields; the number of scientific research institutes to the number of hospitals and laboratories. We do not have an econometric or statistical model. Perhaps the UN Human Development Index can be a proxy, but it is also very limited in range and scope. Contributing to knowledge fields as a society is absolutely central to the understanding of how a state or country made its policies. It is a combined area of knowledge, power and participation policy and issues of a state where, an impressive knowledge base has become available across various disciplines and research tradition from the time when this world begin to step forward as civilized world. The process of rethinking scientific and political rationality is evident in developments within converging fields such as, science, technology, political science including international relations, public administration and implementation studies. It also includes the utilization of knowledge tradition in the policy of sciences, the sociology of science and technology and philosophy of science etc. Without going into the detailed history of all countries/nations, we would suffice to hit the ages and subject areas where we have seen the contributions of knowledge significantly.

Obviously, because of the slow communications and lack of support infrastructure, which we take for granted these days, the older nations were knowledge powers over a longer period of time than presently. A brief statistics as follows:

India 3000 BC to 500 AD- medicine, religious and social texts, manufacturing, mathematics, sciences, chemistry, town planning, agriculture, astrology, astronomy, social sciences, painting, dance, sculpture, music, literature.

China 3000 BC to 1000 AD- Paper making, Gunpowder and weapons technology, sciences, printing, compass, philosophy, medicine, art, architecture, agriculture, historiography, religious and social texts, poetry, astronomy and astrology.

Greeks 700 BC-300 BC- historiography, religious texts, political science, mythology, alchemy, chemistry, philosophy, literature

Islamic World 750 AD-1150 AD- Historiography, religious texts, medicine, astronomy, mathematics, sciences, literature, geography and travel Italian 600 AD-1600 AD-Arts, sculpture, historiography, architecture, religious texts.

British 1700 AD-2000 AD- Arts, sculpture, sciences, mathematics, weapons development, liberalism, painting, cultural studies, engineering, metal working, astronomy, maritime sciences

American 1800 AD onwards- arts, sciences, mathematics, military science, metallurgy, food and agriculture sciences, nuclear science, political science, engineering, space, computer science.

Contributions in the knowledge field by Muslims has long been a site for a cross fertilization of ideas that have led to productive societies. In the open and welcoming climate, intellectuals during the rules of *Umayyads* (661- 750 AD), *Abbasids* (758 to 1258 AD), *Islamic Spain* (711-1492), *Ottomans* (1290-1924 AD); fostered learning environment that allowed the Muslim civilizations to flourish.

The early Muslims, after having consolidated their administrative system, caught the significance of creative impulse especially during the Abbasid period and began to address themselves to learning. During the early phase of their history, the Muslims came across major scientific and higher educational institutions of Alexandria, Baghdad, Cordova (Spain), Damascus, Istanbul (Saud, 1994). The scientific works of Greeks, Romans and Persians found in these and other places caused a great curiosity in them. They did their utmost to make such scientific literature accessible to them. Manuscripts of the territories under their control were in their access while the literature not in their approach was brought from

the foreign lands on Caliph's orders. Sometimes non-Muslim scholars themselves brought such books to the learning centres of Islam (Saud, 1994).

Material thus collected was in Greek, Sanskrit, and Syrian and Pahlvi languages. In order to make it understandable to the Arabs translation was needed. Numerous academies were founded for translation work. The first such academy, known as Baitul Hikma, was founded at Baghdad by Al-Mamoon, the Abbasid caliph (Saud, 1994). There was a rich library and an observatory in it. Such academies, observatories and libraries were also set up in other parts of the Muslim World. Capable researchers were appointed in those academies. Nowadays Muslims often look back to such "golden ages" with wistfulness, admiration and frustration.

3. Factors behind Islamic World's Knowledge Power

Nadwi (1977) points out that many factors played an important role to instate the Islamic World as knowledge power during 750AD to 1150AD. The main factors were religious, spiritual, moral and humanitarian. There are also other factors such as the dynamism and resilience which are inherent in Islam, together with effective and sincere leadership. The following are other factors which we see as the reasons behind the Islamic World becoming a great knowledge power.

Firstly, rulers during the golden ages of Muslim knowledge power were very strong at the top down sponsorship of research and development. In all the examples of knowledge powers that we have mentioned above, the kings, emperors, governments, business bodies all have backed research, development, universities, schooling, etc. to the extent of being personally involved in offering funds, tithes, sponsorship to institutions and people who are engaged in them. In the olden days, there was equal opportunity to all people who wanted to pursue higher study. Brighter students would get sufficient funds to carry out research or produce knowledge. In addition, institutions of learning were strongly and continuously sponsored by the rulers and the state, unlike today, where someone is sponsored for 10 years and then for the next 100 years nothing. The true Muslim intellectual thinks about God and creation "standing, sitting and lying down," he/she strives for objectivity, regardless of personal preferences, demanding evidence, not mere conjecture (Al Quran 3: 191). According to a very popular Muslim maxim one ought to acquire knowledge even if that meant traveling to China (Hofmann, 2000)⁶⁷. On the flip side, it would be noted that countries, which were not knowledge powers, did not really do anything of this sort. The Mongols were great powers, but they did sweat sod at all for knowledge; the USSR was a great military power but its knowledge powers were strangely skewed.

⁶⁷ This statement is not based on an authentic Hadith but very popular.

Secondly, there was respect for scientists, poets, historians, Islamic figures, mathematicians, and the like. The fact that Abu Hanifa (700-767), Malik bin Anas (710-795), Imam Shafi (767-820), Ahmad bin Hanbal (780-855), AlGazzali (1058-1111) and many other intellectual-luminaries were teachers or researchers who were frequently considered to be top of the heap (Ahmad, 2002). They may not have gotten much money or salary, but boy, were they respected. Galileo was penalised and there are many other examples in the western world, but generally, in the Islamic history of knowledge powers, an intellectual, scientist or knowledge producer was highly respected. When one looks at the other end of the spectrum, teachers and scientists are unfortunately not respected at all. We see this in the UK and USA where there is a strange feeling of anti-intellectualism. We see this in our schools where a brainy kid is called by derogatory names such as jerk, nerd, four eyes and so on and so forth. There is hardly any respect for knowledgeable people. If one wants to see how they are respected, he or she can carry out this small exercise at a high school or college in any Islamic countries from Morocco to Brunei or even in India. He or she can ask about high achievers of the school or colleague and then ask their peers about them, or see how their professors and intellectuals are treated. The differences can be observed in this way.

Thirdly, the concept of centers of excellence was present in these knowledge centers. There were the university or knowledge towns of Alexandria, Baghdad, Bashra, Bokhara, Cairo, Cordova, Damascus, Istanbul, Nishapur, Samarkhand, etc. People would congregate there in large numbers, both professors and students, and there would be visiting scholars and scribes. People would go there purely to study, research, perform and read. These cities would possess schools, laboratories, universities, libraries and amphitheaters. But the main thing about this phenomenon was that there was a critical mass of people who would carry on producing knowledge. Just like one swallow doesn't make a summer, just one researcher won't go a long way to make a knowledge power. It needed lots of people congregating together. Synergy would be produced and the entire town would hum with intellectual horsepower. There could be one, there could be many such centers but the key is that there would be groups of people who would congregate together according to their discipline and produce knowledge.

This leads us to the fourth factor, having a proper infrastructure to facilitate knowledge production. This factor overlaps with the first and third factors, but is important enough to be discussed separately as it has certain aspects, which were not catered for previously. Physical infrastructure is vital for being a good knowledge power. It encompasses diverse elements ranging from good roads, to physical security, ports to telecommunications, electricity to presence of paper making factories, good sources of food and water, health institutions, arts and crafts institutions, museums, opera and drama houses, churches, temples, living quarters and sewerage systems.

The fourth factor was the great knowledge powers that we mentioned had good infrastructure, they were at peace, trade happened, industry and services were present, etc. Knowledge cannot be produced in a vacuum, but needs developed infrastructure to support it

The fifth factor was presence of capital to convert ideas into action. The kings and emperors of old devoted monies and funds to their centers of excellence, scientists, engineers, chemists and metallurgists. During the Islamic renaissance the potentates devoted significant chunks of change to research and sciences. The Abbasid Caliphs such as Harun Rashid and Al Mamoon were famous for their philanthropy and providing capital to support inventions and discoveries (Ahmad, 2002). The whole saga of finding longitude and an accurate chronometer can be related to the availability of capital by the military and tradesmen of Muslim Emperors.

The sixth and final factor was that there was freedom of speech, individual liberty, concept of private and intellectual property in these knowledge powers. In Islamic world there was freedom of speech. A man could research and study what they wanted. We should not assume that the standards of freedom 3000 years back were identical to those of now, but comparatively speaking, a man could go into a royal court and proclaim a new invention, without fear of retribution, imprisonment or death. This is a critical aspect. If man's mind is fettered by fear, then obviously it cannot go about creating knowledge, but will keep shut and mum.

We have explored some reasons behind knowledge power in Islamic world. Given our long and varied human history, for countries that want to become knowledge powers, we can learn a lot from how previous knowledge powers operated.

4. Contribution of Muslims in the Knowledge Field

Nasr (1993) argues that "a knowledge which has always been and will always be, and which is of universal character both in the sense of existing among peoples of different climes and epochs and of dealing with universal principles. This knowledge which is available to the intellect is contained at the heart of all religions or traditions, and its realization is possible only through those traditions and by means of methods, rites, symbols, images and other means sanctified by the message from Heaven or the Divine which gives birth to each tradition. The "Philosophia perennis" possesses branches and ramifications pertaining to cosmology, anthropology, art and other disciplines.(p. 54)." Nasr (1993) believes that an adequate information must be provided about past Muslims' intellectual contributions in the knowledge field in order to inspire the researchers for further development in the contemporary knowledge field and to meet the intellectual challenges posed by the modern world. The contribution of the Muslims in the knowledge field during the period 750 to 1150 AD was enormous.

The joyful curiosity of earlier Muslims, combined with a readiness to exert one's mind, was the right platform for extraordinary development of the 'knowledge

power' from the late eight century onwards, a few striking examples of which are outlined below (Arnold and Guillaume, 1931). A brief history of Muslims contribution in the knowledge power is discussed below⁶⁸:

Ibn Firmas (died 888) to whom the first flying machine is attributed.

Muhammad bin Musa Al-Khwarizmi (died 846), father of algebra (Al Jabr) and of the algorithm;

Abu Bakr al Razi alias Rhazes (864-935) whose medical work *Mansuri*, the *Liber Almansoris*, was used for centuries in European Universities;

The philosopher and physician **Ibn Sina** popularly known in Europe as **Avicenna** (980-1037), whose medical encyclopedia was still in use in European Universities in the early nineteenth century;

Al Hasan Bin al-Haythan popularly known as **Alhazen** (965-1039), inventor of the camera obscura;

Abu al Rayhan al Biruni (973-1050) who was a universal genius at par with Goethe, historian of science, diplomat, student of sanskrit, astrologer, mineralogist, pharmacologist, etc;

Umr al Khyyam (died between 1123 and 1131), poet and mathematician. He also reformed the Indian calendar with greater accuracy than the 1582 Gregorian calendar;

The jurist/philosopher **Ibn Rushd** popularly known as **Averroes** (1126-1198) who as a multiple commentator on Aristotle has a great influence on Western philosophy. He also discovered sunspots;

Ibn al Nafis (died 1288) an Egyptian physician who discovered blood circulation,

Ibn Battutah (1304-1377), a Moroccan globetrotter at par with Marco Polo and reached Timbuktu, Peking and the Volga;

Ibn Khaldun, an Andalusian whose introduction (*al Muqaddimah*) to his history of the world (*kitab al ibar*) made him both the founder of sociology and modern historiography, introducing a revolutionary critique of traditional historical sources;

The navigator **Ahmad Ibn Majid**- a fifteenth century authority and ocean voyages,

Ocean geographer and admiral **Piri Reis** (1480-1553), a Turkish Muslim whose *Kitab-i-Bahriye* with its precise maps of the seas, still amazes the researchers.

⁶⁸ See for details Marshal G.S. Hodgson, *The Venture of Islam*, Vol. 2, Chicago, 1974

Muslim rulers of Middle Ages patronized scientific learning and research. They vied with each other in attracting the best scholars to their courts. Due to the patronage of Abbasids, Ummayyids and other Muslim rulers in the field of education and scientific discovery, Baghdad, Damascus, Cairo, Cordova and other places became great centers of scientific development and learning (Bucaille, 1982). Between 8th and 13th centuries, at the time when restrictions on scientific development were in force in the West, a very large number of studies and discoveries were being made at Islamic universities and the remarkable resources of the time were found (Arnold and Guillaume, 1931).

There was a tremendous explosion of different branches of knowledge in general and the scientific-technological field, in particular, in the Islamic World. It will be reasonable if we say that the cultural exchange in the Muslim countries was a one way street. Hofmann (2000) states that Muslims could hardly find anything worth learning from the occident. The West was a 'net importer' from the windmill and troubadours' songs to the 'Gothic' pointed arch. This cultural imperialism and one sided globalization-as we would call it today- quite naturally left traces in European languages. When people of the world speak of admiral, algebra, cipher, amalgam, alcohol, lute, guitar, alcove, muslin or tariff, they are still using Arabic vocabulary (Hofmann, 2000).

5. Factors behind the Fall of Muslims' Knowledge Power

From 13th century onward, the brilliant Islamic intellectual activities which shone so brightly in contrast to the darkness of Christian West began to fade. The nations once sunk in barbarism started their scientific adventure while the Muslims turned their back to it. Researchers have propounded different theories to give the answer to this question. Some of them consider that political downfall brought scientific activities to close. Other blame that religious orthodoxy became hurdle in the way of scientific progress. Still other think that economic systems and non-productivity of science compelled Muslims to give up socio-economic and scientific research. In the following paragraphs an effort has been made to find out whether a single factor was responsible for the backwardness of Muslims in the different fields of knowledge or if all these factors, somehow or the other, stopped scientific activities.

(1) The Muslims remained supreme for a long time but in 13th century they lost their force and vitality. This invited others to attack their territories. Tatars' invasion in the East and the Muslim expulsion from Spain deprived them of their past position. This settled deathlike gloom in the centers of learning at Muslim lands. In the former case, the humans were killed indiscriminately and books in the libraries were consumed to ashes. The accumulated treasures of five centuries were lost for ever to humanity (Hitti, 1986). According to Hitti (1986) and Ahmad (2002), the Christians destroyed the intellectual life of the people in

Spain. Along with killing, expelling or converting the Muslims to Christianity, the centers of learning were also destroyed. Hitti writes that even Spanish baths were considered a relic of infidelity and were demolished (Hitti, 1986). Thus, the golden period of Spain came to an end. On the other side, African lands became victims of political turmoil. In Western Africa, the tides of progress was turned back due to the up rise of Berber fanaticism. The centers of learning were converted into the centers of ignorance. There was anarchy in Egypt which discouraged the cultivation of peaceful knowledge. No rulers were left to patronize learning.

(2) Political decline paved the way for a drastic change in economic system formerly based on trade and urban civilization. Under this system Muslim science flourished. From the 12th century onwards, volume of international trade was concentrated and urban wealth declined (Ahmad, 1978). These changes gave birth to the feudal system which turned the tide back.

(3) It is true that in the history of Islam certain believers had harboured a negative attitude towards science, technology and other fields of knowledge. This is a fact that at certain periods, the obligation to educate oneself and others was neglected. It is equally true that in the Muslim world an attempt was sometimes made to stop scientific development. Degenerated type of mysticism also proved injurious to scientific progress in Islam.

6. Scope of Initiatives to Power the Knowledge Economy

Discoveries from within an Islamic perspective, carrying the legacy of the Muslim past, and with the burdens of its present view, it was only natural that the priority and the emphasis should be given to rousing Muslim scholars and thinkers to their responsibility towards the Ummah (Abul-Fadhl, 1992). Therefore, the future of members of the Organization of Islamic Conference (OIC), countries are linked to the knowledge power, and success of Muslims in it will depend upon how well Islamic intellectuals nurture and grow the human resources. "Knowledge power" is used here to include not only the three "Os"- technologies related to info, bio and nano - but also knowledge-based manufacturing and knowledge-based agriculture. All these - and the conventional high-tech areas of nuclear energy, space technology, materials science, etc. - will require human resources of the highest capabilities, in large numbers.

In fact, OIC member countries biggest potential strength is the capability of skills, and especially of high level skills. In the area of information technology (IT), some of the Islamic countries are already seeing an increasing recognition of this. Thus, whether it is a massive ramping up of simpler skills or deploying large numbers of doctorates in research and development (R&D) off-shoring, the Islamic World has proven its competitive edge over rivals. However, to retain this advantage and, hopefully, further widen the gap, it is essential that they should produce ever-greater numbers of even better qualified professionals.

Demographics are on the Islamic World's side: Islamic countries are spread over from Rabat to Bandar Seri Begawan with a majority of young people. The projections indicate that both the number and proportion of working-age people in the population will continue to rise for a couple of decades. In contrast, all the developed countries and, surprisingly, USA too, will face substantial shortages of working-age people. Except for Islamic World which is estimated to have a surplus of 32 million working-age people in 2020, the United States alone will have a deficit of 17 million. While immigration may reduce the shortage, clearly it cannot bridge such a huge shortfall. This means that off-shoring will not just continue, but gain greater momentum in the years to come. To take full advantage of these demographic trends, the Islamic World needs to ensure the availability of a skilled and educated workforce.

Present selection ratios, combined with past growth rates in the expansion of tertiary education, indicate possible shortages in the needs for both the IT (information technology) and business process outsourcing (BPO) sectors. Other knowledge sectors will similarly face shortages. The problem is not so much the availability of graduates, as the very low selection ratios, indicating inadequacy of skills. This reflects poorly on the general quality of education. While the top 10-15 per cent of graduates in Islamic countries are near world-class, a substantial proportion are below average. Therefore, the challenge is to raise the floor. This is true not only for science and engineering, but even for non-technical graduates. The selection ratio for jobs in the booming IT-BPO sector which is below 10 per cent, illustrates this rather starkly, since the requirement for skill sets here is comparatively simpler.

The problems are many-fold and inter-related. The quality of teaching and faculty in the Universities of the Islamic world is a major problem, and one that is of serious long-term concern. This affects multiple batches of graduating students, with a major impact on the quality of the future faculty. The short-term solution is faculty training and faculty development programmes. Ensuring that the curriculum is up-to-date and relevant is another issue. Industries sector of the OIC member countries can play a major role in this by sharing trends, likely future developments and the requirement of skill-sets. It is important to build up a strong conceptual foundation, so that in a world of rapidly changing technology, the graduate can master new developments. The ability of learning how to learn is an essential part of good education.

Infrastructure, especially for science and technology education, needs to be upgraded and continuously updated. Laboratory equipment, libraries, and computers with high-speed connectivity, well-equipped classrooms: all these need to be at least adequate, if not world-class. As the Islamic countries will do more work of greater sophistication, there will be needed for qualified researchers-those who have done a Masters or a doctorate-is going to grow

gradually. Islamic countries cannot achieve its real potential or fully tap the potential of talented individuals, unless they have large numbers of people at the highest level of research in the universities. At present, the numbers are truly dismal; one estimate indicates less than 560 PhDs in technology each year. Equally worrying is the quality: much research tends to be repetitive and irrelevant. Attracting more people into M.Tech and PhD programmes is an urgent necessity, as is the need to ensure that the research they do is relevant. In fact, the inter-relatedness of these problems indicates a solution. If the research done is relevant, industries will value it. MTech and doctorates will then be in demand in the industry sector and will command a good compensation. In turn, this will attract more and better graduates to join an MTech programme rather than take up a job. Possibly, even those who take up a job immediately after graduating may choose to return to university for an advanced degree after a few years of work.

The greater number of M.Tech and PhDs, in turn, will help to reduce the problem of faculty shortages as well as quality. However, to do this, teaching needs to be made a more attractive profession. Today, in most of the Islamic countries, not only are teachers poorly paid, even their social status has suffered a decline. This is a tough problem. While raising the salaries of teachers is a very desirable step, it is obviously a difficult one. Even while this is pursued, industries could help by providing funding for research, for facilities, and sponsor faculties to travel to conferences. This will certainly encourage teachers and permit them to pursue their research interests more fully. It will make the profession more attractive and may help in getting more people to join it.

In the non-technology area, it is essential to make education more relevant to today's needs. Even while a strong theoretical and conceptual foundation is laid, the three years of a degree education must include skills that industry needs. An overwhelming majority of students go into the employment market armed with only BA/BSc or business study degrees. Ensuring their employability is a responsibility, academics and industry need to address together. Given the low load on students in most under-graduate courses, a series of optional, parallel, skill-building courses may be considered. "Soft-skills" such as communication and teamwork must be an essential part of the curriculum in all streams.

Quantity is not a serious problem today: the number of engineering seats is around 300,000 and the number of all graduates is around 2.1 million a year in the OIC member countries. However, as mentioned earlier, the projections of needs are also the potential demand of a substantial expansion. While doing so, it is vital that quality is not only maintained but improved. With privatization, market forces will hopefully play a role in ensuring quality. It may, however, be necessary to go beyond market forces. This may be one area where the governments of the Islamic countries can set the highest standards, creating a benchmark for private institutions. The Governments of the Islamic world must

seek to create at least a dozen world quality institutions such as Massachusetts Institute of Technology/Indian Institute of Technology and Harvard Business School/ London School of Economics each year, in all disciplines.

To stimulate private sector investment in truly high-quality education, the Governments of the OIC member countries should create, on an experimental basis, special education zones (SEZs) or areas where bureaucratic and other regulatory constraints are removed, with complete freedom of recruitment, compensation, import of equipment and students from all over the member countries of the OIC. This may help make the Islamic World a major global education centers.

Islamic countries also need to foster innovation, an area in which the Islamic World has a unique advantage. This requires that Islamic teaching be made compulsory with each branch of study in schools, Colleges and Universities. There is a need to change the examination system, and bring openness into the higher education system. Islamic world should produce such Muslim scholars well versed in Islamic teachings combined with modern knowledge so that those scholars will be competent to apply Islamic principles to the problems of contemporary life. Higher educational institutions need to inculcate the habit of questioning answers, rather than answering questions.

A final critical element for the future of the knowledge industry is the need to attract more of the brightest students into science, the foundation for all technology. Better science and mathematics teaching in schools, better laboratory facilities and an up-to-date curriculum are all necessary, as are many more top-quality Universities like Oxford, Cambridge and Harvard Universities. Much of this needs a private-public partnership, and close industry-academia interaction. Only through this the dreams of Islamic world as a global knowledge power be realised.

Conclusions

In this paper we discussed what makes great knowledge powers and we noted that it is due to six main reasons. A strong top down sponsorship of arts and sciences; respect for scientists and artists; a basic minimum number of artists and scientists who congregate together; having the proper infrastructure needed to support a knowledge generation; presence of capital to convert ideas into action and finally, the freedom of speech, individual liberty and ability to research almost anything that their minds take them to.

Most of the Islamic countries accepted the western model of knowledge power without criticism. Al-Faruqi (1992) points out the need to evaluate western knowledge including science, but fails to generate serious debate. Moudoodi (1987) argues:⁶⁹ "in my opinion there are three or four areas which require immediate attention: jurisprudence (Fiqh), economics, social sciences, philosophy and theoretical sciences. In all these areas research should be conducted with firm belief in the philosophy that Quran and Sunnah of the Prophet are really the perennial source of knowledge and we have to draw everything from this source alone (p.7)."

⁶⁹ Quoted in M.R.Kirmau and H.Muhsin, Basair-e-Moudoodi, Aligarh, Centre for Studies on Science, 1987, p.7

The success of the Islamic World in the struggle in politics and economics has served to intensify their intellectual activity. The scholar and scientists those who have patterned their thoughts after the intellectual dimensions of Al-Quranul Al Kareem have excelled not only in their originality but also in their appeal to the people (Kirmani, 1989). Their attempts to develop knowledge power are valuable.

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