

CHAPTER 5

The Relationship between Science and Government in Iran: A Historical Perspective

In this chapter we shall look at the relationship between Islam, science and government in Iran from a historical perspective. We will shall by looking at science in Iran in the ancient (pre-Islamic) period, in the Middle Age after the advent of Islam, and finally in the modern period. By providing the historical background to the relation between science and government in Iran, it is hoped that we can better appreciate and understand the views of selected Iranian thinkers on Islam, science and government. This we will provide in the next chapter.

5.0 Introduction

It is needless to say that the scientific advancement in any country is directly affected by the significance that science has for its rulers. On the other hand many scientists and philosophers believe that the government has a significant role in the well being and welfare of the society. In this part, the objective is to prove that governmental policies have a direct effect on advancement of technology. Therefore based on this reasoning many governments in history have increased the pace of advancement of science and many more have in effect stopped its growth with their policies. Ibn Khaldun (May 27, 1332 AD– March 19, 1406 AD) was one of the first thinkers who discussed the significance of political decisions on the matter. He writes:

it is probable that scientific age ends anytime soon in the West heartland, as the government has shrank and disappeared (Ibn Khaldun, 1996, p. 875).

He clearly explains his concern regarding the downward spiral science as a result of weakening of governments and believes that in such a situation, researchers seek to be quiet and keep away from research and do not try to improve the conditions

of the scientific realm but instead will be happy with the level achieved by the time. Michel Foucault (15 October 1926-25 June 1984), one of the prominent Western thinkers at the present time deeply believes that there is a strong correlation between political will and scientific advancement. No governance is imaginable without a degree of respect to science and no science is useless for the government on the other hand. They have a correlation, but as correlation is never the sign of causality, therefore none is the cause for the other one (Dreyfus & Rabinow, 1983 p. 216) . As there are divisions on the types of governments, namely democratic, nondemocratic and Islamic, we will study the role of science in each of these and explain the position of science in their respective policies.

5.1 Science in Democratic and Nondemocratic Governments

There is a very close proximity between science and democracy in countries. Meaning that knowledgeable people opt for democratic governments and such governments help science to advance rapidly. Therefore, a real democracy is never achievable until a desirable level of scientific advancement in a country (k.farsoun & mashayekhi, 1992, p. 163) is achieved. On the contrary, in a closed dictatorship there is no room for advancement of science as research is banned. We can see that the fall of many governments has been the direct result of ignoring the scientific societies of their time, such as the fall of church power in the Medieval period in Europe.

Now even this science can be harmful as the building blocks of the Western governments is humanism which is empty of spirituality. Therefore, such governments have used science in a utilitarian way and this view of science can be harmful to the society as a whole. This will put science in the hands of a handful capitalist that use science in the way of their own profit. It is dangerous to put science in the hands of capitalist as many thinkers such as Karl Marx believe that such a process will fail

scientific advancement. As a consequence of such overwhelming presence of the capitalists in the scientific and political environment, total destruction of the human society will be predictable. This is an idea endorsed by Marx, Spangler, Jürgen Habermas, and other thinkers of the Frankfurt School.

As a result, for science to advance in a country there needs to be a society prepared for that, as Reza Davari Ardekani believes that in the developing nations, there is a utilitarian look at science which explain that science is just required for their success and economical achievement, rather than an understanding based on the respect for science itself.

On the other hand, Soroush believes: “the type of governance-democratic or nondemocratic-is understandable by observing its relationship with science, meaning that science-centered governments are mostly democratic and Platonic governments mostly dictatorial. Therefore through material science there will arise a dictator-like government whereas through spiritual science emerges a democratic ruling. (Soroush, 1994a p. 346) Mohammad-Taqi Ja'fari-an Iranian philosopher, (1923 - 15 November 1998) -believed that the biggest threat to science is creating a “scientific democracy” to achieve their own materialistic goals (Jafari, 2000, p. 89).

5.2 Position of Science in Islamic Governments

The role of science and scientific advancement in Islamic governance is very high that it is considered to be one of the factors of legitimacy of a government. The Islamic government is supposed to be motive for the inspiration of science. In fact, Islamic government was the main fuel for the scientific achievement of Muslim scholars during the Islamic civilization. The significance of science in Islamic ruling is agreed upon by all Islamic denominations. Al-Farabi (c.872-between 14 December, 950 and 12

January,951) considers science and wisdom as the two most important characters of the Islamic ruler which is governing the Islamic utopia and he believes science is guardian of *Sharia* and the tradition of Divine. Khajeh Nasir al-din al-Tusi (18 February 1201-26 June 1274) mentions that the science required by the Islamic leader is *sharia*, judgment, social etiquette and, etc without which governing is an impossible job (Tosi, 1956, pp. 15-21).

In the Islamic tradition, there has been a special emphasis on the role of science on political lives. Even the theory of guardianship of the jurists is based upon the idea that government needs a certain amount of *Sharia* knowledge and the leader of an Islamic country needs to have that knowledge to be able to govern the Islamic nation. Al- Sheikh al-Mufid (c.948-1022CE) believed that governing an Islamic nation without the required knowledge of *Sharia* is not allowed in Islam (Shaykh Mufid, 1410A.H:810-812). Ayatollah Khomeini (22 September 1902- 3 June 1989) based his political theory on the knowledge of the Quran and *fiqh* by the leader.

From what has been mentioned so far one can understand that science is one of the most important contributors to the legitimacy of a government in Islam and one of the most important characteristics required for an Islamic leader to possess.

As mentioned above, an Islamic society is a science-based society in which the Islamic leadership is expected and assigned to invest and encourage the advancement of science. On the other hand, it is required to privilege all people equally on the right to study and obtain knowledge (Ahmadi, 4/3/2009). One such emphasis comes from the Koran in which there is enormous encouragement for the Muslims to pursue science. There are many verses in Quran which encourages and even Prophet Mohammad himself assigns Muslims to learn and obtain the expertise required by them to

participate in the society. This is the very reason which led to the rapid advancement of science and technology in the Islamic world during the glorious Islamic Civilization.

This great reign did not last long, with the disappearance of the real Islamic governments and the empowering of the corrupt powers, the emphasis on gaining knowledge and advancing the expertise disappeared among the Muslim thinkers and this led to the present day suffering of the Islamic nations. The most important contributor to this demolition of scientific position of the Muslim World was the rise of dictatorial governments which either satisfied their own imperial lust or were trying to please their colonial counterparts. This is the main reason behind the consumerist attitude which became fashionable among the Muslim nations and kept the advancement of science in Islamic countries on hold.

The militarism to invade and conquer new territories which, was consuming all the energy of the Muslim World, kept the Islamic Civilization too busy for scientific breakthroughs for at least two centuries. After the second century, this trend slowed down, and as a result of relative calm and social relief, the relations with other places of the world improved and the new scientific revelation began consequently. In contrary to Ummayyad Kaliphat, during the Abbasid Kaliphate the shift to science was apparent. This was the beginning of the era of scientific achievements in the Islamic territories.

Another important factor in the scientific achievements of the Islamic scholars was the translation of the foreign texts to Arabic by Harun and al-Ma'mun (reigned 813 – 833) whose contributions to the scientific and experimental achievements of the Islamic civilization were very huge. As George Zaidan, the prominent Lebanese historian believes that: “Islamic ideology has always played the role of a running engine for the growth of literature and science in Islamic societies and territories. The whole scientific revelations of the golden Islamic era have its roots in the Islamic support of

science and literature” (Jdid Bonab, 10/4/2008). This was the main golden era of the Islamic Civilization and Imam Ali said to his fellowmen:

Oh my people! My responsibility upon you is to supply you with your needs and increase it up to a point of satisfaction, thus your responsibility is to learn and to gain knowledge and expertise and etiquette (Abi-Talib, 1996, p. 107,saying 34).

For many apparent reasons the leaders of the Islamic society expected their people to lead their life in a proper way-thus assuming responsibility for the education of their children. Therefore, teachers were assigned by the governor to teach and educate in many areas was for free and in most others very affordable. The necessary competition between the leaders to materialize the aim was an important factor in this process. Unfortunately, this whole success story ended with leaders who ignored Islamic principles and turned to power struggles and corruption, and this was the end of the golden era of Islamic dominance of science and technology.

5.3 Position of Science in Pre-Islamic Iran

In this part we begin by looking at the historical relationship between science and government in Iran before the coming of Islam.

5.3.1 Science and Religion before Islam and during the Achaemenid Empire (550–330 B.C.E)

The first official government after the Medes (612 BC until 549 BC) which introduced order to Persia was the Achaemenids. The inscription left from this period clearly indicates the scientific and ideological level of the Persian people in this era. The main reason to this was the situation of Persia as the cornerstone of great civilizations such as Mesopotamia, Egypt and India. The close relationship between the priests and the Achaemenid kings clearly shows the effects of Zoroastrianism on politics in that era. Teaching of Avesta (the primary collection of sacred texts of Zoroastrianism) is apparent in that era (Zamiri, 1994, p. 61). On the other hand, there were gigantic schools

for medicine and other sciences in that era. There were huge libraries in various parts of the country such as in Kohandezh, Estakhr and Schepigaan (Hekmat, 1971, p. 64). There were institutions which had the responsibility to gather and protect the religious scripts and materials. This shows the importance of the matter even in that era. Also the support of the royalty for astronomical and scientific research was enormous (Bayani, 2000, p. 2).

The result of such supports was the creation of a very precise solar calendar by the Persian scientists which tabulated the exact length of a solar year (364 days, 6 hours and 15 min). Their tabulation was in fact so precise that modern calculations differed only 26 minutes with their calculations (Zamiri, 1994, p. 21). In several historians' quotes, we can find traces of an internal newsletter in the Achaemenid royal family. Based on the writings of Herodotus about the Achaemenid Dynasty the significance of science in that era is revealed (Bijan, 1971, p. 333).

Darius and Xerxes I had personal delegations for scientific and geographical discoveries. There are as well countless other clues proving the scientific and cultural dominance of the Persian civilization in that era; be named are:(Stewart Avens, 1965, pp. 218-222)

- 1) Construction of the Suez Canal which is a waterway in Egypt, connecting the Nile and the Red Sea during Darius' reign as a significant sign of engineering practice in the time; (Hekmat, 1971, p. 443)
- 2) Establishment of an academia in Egypt for training governors (Bijan, 1971, p. 338);
- 3) Construction of the royal road which was stretched from Susa to Aegean Sea (Stewart Avens, 1965, p. 312);

- 4) The historic discussions of the seven Persian generals about the pros and cons of different types of governance after the defeat of Samardis (Stewart Avens, 1965, pp. 218-222) ;
- 5) The process of installation and selection of the lawyers among those trained (Soltanzadeh, 1985, p. 18);
- 6) Based on the findings of the clay inscriptions which were excavated in Persepolis, the depth of the knowledge of the Persians on finance and its importance as well as prominence of training and education and archiving become clear (Hekmat, 1971, p. 152);
- 7) It is clear from the carpets which date back to Achaemenids in Hermitage Museum in Russia that Persians had extensive knowledge of carpet industry, color relations, botany and alchemy (Hekmat, 1971, pp. 261-264);
- 8) The existence of places such as Persepolis is a clear manifestation of high level of engineering and architecture knowledge among Persians.

5.3.2 Science and Religion before Islam and during the Sassanid Empire (224-651)

Perhaps the best example of cooperation between religion and politics in pre-Islamic era was the Sassanid Empire from 224 to 651 AC. Many believe that this was the greatest era of the pre-Islamic Persian history in which the building blocks of the Persian Civilization was set and this was the bases of the Persian influence in the centuries to come. During this period the boundaries of Persian Empire was stretched to the Black sea, Saudi Arabia and Yemen. The Kings of Sassanid Empire were all the holders of fire at altars who were all considered religious figures (Majd, 2005, p. 49).

Ardashir I set Zoroastrianism as the official religion of the country and by this he united the nation. This is therefore what made the elites of the society a level higher than the normal people and gave a high position to religious figures.

Jondi-Shapour was the most important scientific institution in this era which was located in the city of Jondi-Shapour and was not destroyed until 4 centuries after the invasion of Muslims to Persia. At this institution Persian scientists studied along with other scientists from India, Egypt and Greece, who had fled their country after many wars. It is said that at the doorstep of the institution there appeared this slogan: “Science and character is prior to power and sword ” (Dorani, 1997, p. 46). Although, Jondi-Shapour was the institution of which many sciences were discussed and researched, medicine was the most prominent field in the institution. Many of the most important figures in medicine and pharmacology were trained at this Institute. The significance of the Institute of Jondi–Shapour only increased during the reign of Khosrau I, the King of Persia. We said before that as a result of unrest which followed the closing of the Athenian academies in 529, the philosophers were spread around the world and 7 of them emigrated to Persia and were welcomed by Khosru (Ghirshman, 1985, p. 332).

5.3.3 Science in Iran after Islam:

One of the aspects of education in the era before the invasion of Arab Muslims to Persia was the exclusivity of the right of education to the elites. With the beginning of the Islamic Caliphate in Persia the exclusive right to study was crumbled. Therefore everyone had the right to study. As mentioned above, the beginning of the Islamic caliphate in Persia changed the society and culture to its cores and education was not an exception. In fact the first change started with altars which were changed to mosques.

It was said before that by the beginning of the Islamic era the exclusive right to study for the elites was ended but this doesn't imply that all the privileges of the elite class were abolished. With the beginning of the Umayyad Caliphate this tradition of equality was abolished and new tradition of unfair privileges to the elites started. What is most apparent is the new scientific and cultural institutions such as observatories, hospitals, schools, academies, temples and etcetera. Undoubtedly though, mosques were the front runners of this evolution. With rising number of researchers and students, the number of subjects offered at academies increased.

5.3.3.1 Umayyad Caliphate (661-750)

The scientific and cultural dominance of the Persian Empire deteriorates in this era. It is needless to mention that the religious relationships between the rulers and the political elites since the rulers themselves were the caliphates of God and therefore, their reign was utmost religious in its core. Therefore, it is better to limit the discussion to the relationship between education and the rulers. In this period the educational system and the academia elites of the society start to deteriorate. Although the Umayyad Caliphate was considered as a religious ruler, but most historians believe that their family was of low behavioral and ethical qualities. The only well-known scientist of this era was Ruzbeh who was the architect of Basra and Kufa.

5.3.3.2 Abbasid Caliphate (750-1258)

Despite the same practical religiosity as the Umayyad Dynasty, during the Abbasid caliphate the relationship between the scientific elites and the rulers shifted a lot. With the rise and widening of the Islamic Empire the rulers looked for Persian expertise in ruling the lands. This was prominent during the 2nd century when the Persians had a greater role in power during the Abbasid Caliphate (Almasi, 1991, p. 52).

It coincided with the rise of the House of Wisdom (Arabic: *Bait al-Hikma*) which was a library and translation institute in Abbassid-era Baghdad, Iraq. It was a key institution in the Translation Movement and was considered to be a major intellectual centre of the Islamic Golden Age (Almasi, 1991, p. 53). It was at this institute that many of the classical works of writers and scientists from around the world were translated to Arabic. And this was the beginning of the introduction of foreign sciences and technologies to the Islamic Civilization. Georgi Zaidan the famous Arab historian believes that most of the academics in the *Bait* were of the Persians.

The famous scientists of this era were: Abu Sahl Nubakht: astronomer and librarian, Musa Jabir Bin Hayan: chemist and astronomer, Omar Forghan Tabari: astronomer and architect, Balkhi: astronomer and theoretician.

5.3.3.3 Tahirid Dynasty (820-872)

Tahirid Dynasty was the first independent rulers who were proud of their Parisian past (Zarrinkoob, 2000, p. 497). Nevertheless they maintained a higher attention for Arabic language. some of the famous scientists of this era were: Abu Saeed Gorgani, mathematician and astronomer, Sahl Tabari astronomer and doctor, Ahmad Nahavandi, astronomer, Sahl Ibn Tabari, astronomer, Khwārizmī, mathematician, Issa Mahani, mathematician and engineer.

5.3.3.4 Samanids Dynasty (224-651)

They were very supportive of the scientists as well and during their reign many books were authored and many scientists were trained (Almasi, 1991, p. 339). Abu Nasr Al-Farabi, philosopher and physicist and Ahmad Sahl Balkhi, mathematician, were of the greatest scientists of this era.

5.3.3.5 Ziyarid Dynasty (928-1043)

This was a Persian Dynasty that ruled in the Caspian sea provinces of Gorgan and Mazandaran from 928 to 1043. They were very proud of their Persian past and tried a lot to revive the lost pride and dignity (Almasi, 1991, p. 339). Among the scientists of this era are: Keikavus ibn Iskandar, the author of *Qabus Nama*, and Fazl Hatam Tabrizi, mathematician.

5.3.3.6 Buyid Dynasty (934-1055)

Like their predecessors, the Buyids also attempted spreading science and research among the nation. Their emphasis was on Baghdad and at the same time, a puritan movement called Brethren of Purity was active, trying to clear religion from impurities and superstitions (Zaydan, 1991, pp. 600-601). The famous scientists of this era were: Motahar Bin Taher Ghodsi, number theorist and encyclopedic, Razi, chemist, Mohamad Bin Khwarazmi, encyclopedic on mathematics, geometry, astronomy, mechanics and chemistry, Abu Jafar Khazan Zade, mathematician and astronomer.

5.3.3.7 Ghaznavids Dynasty (963-1187)

They were one of the Persian rulers who were originally Turk who replaced the Samanids. At the beginning of their reign, a series of killings based on religious beliefs began but with the passage of time, Mahmoud Ghaznavi was deeply influenced by the Islamic civilization and ended such activities and began building mosques and schools (Soltanzadeh, 1985, p. 92). The presence of such poets as Onsoni Balkhi, Kassaei, and scientists such as Biruni is a witness to how much Ghaznavids supported the role of science and culture (Basort, 2002, p. 133).

During their reign many institutions were established for example in Beihagh four schools were constructed by Abu Ghasem Amru which were intended for different

Islamic branches of study and research. Ray and Isfahan were two of the cities which turned into centers of science and culture (Almasi, 1991, p. 340). One of the interesting aspect of their reign was portable hospitals which were carried by camels and were not only a means for the general health, but also an establishment for training basic skills in medicine(Soltanzadeh, 1985, p. 95). As a result of such supports, we see the rise of scientists such as Sahib Ibn Eyad, Ibn Babuye, Ali Bin Abbas, Miskawayh, Persian philosopher and historian from Ray, Sufi Razi, Abū Rayān al-Bīrūnī, and others.

5.3.3.8 Great Seljuq Empire (1038-1194)

Seljuqhis were Sunni Turks who started their reign from the East and during their power, many new cults started to arise. Although their reign was accompanied by many examples of suppression and terror but we have to accept their prominent role in the cultural and scientific revolution of their time (Fisher, Gershevitch, & Yar Shater, 1993, p. 203).

With the rise of Great Seljuq Empire, new gigantic academies, known as Nizamiyya, which were a group of the medieval institutions of higher education, were established by Khwaja Nizam al-Mulk in the eleventh century. The name Nizamiyyah derives from his name (Zamiri, 1994, p. 54). Founded at the beginning of the Seljuk Empire, these Ash'ari-Shafi'i theological schools are considered to be the model of *Madrasahs*, or Islamic religious schools. This was the successful example of new life of education in Persia after Islam which became a building block for the development of other institutions in the years after. These institutions were financed by the fees which were intended for the students and this fee would be enough for maintaining and development of the establishment of Nizamiyyahs. The most prominent scientists of this era include Avicenna (980 - 1037), Ghazali (1058–19 December 1111), Nasir al-Din al-Tusi (18 February 1201– 26 June 1274, Saadi Shirazi (1184 – 1283/12910 and many

more. (Iqbal Ashtiani, 2000, p. 108) The establisher of this institution-or to be more exact university-was a politician and a religious figure. Therefore, it was not merely education which led to the establishment. The institution was in fact based on the idea to confront other branches of Islam and protect the *Shafi'i* ideology and its theoreticians.(Zamiri, 1994, p. 100)

At the *Nizamiyyahs*, students studied up to the highest levels and among the various branches, Baghdad was the most important centre. Saadi, was one of the major Persian poets of the medieval period who studied at the Baghdad *Nizamiyyah* (Zamiri, 1994, p. 54) . Although the academia was very much closed to most branches of Islam other than *Shafe'i*-the main contribution of these schools was not merely supporting one branch against others in Islam. After the death of Nezamol Molk, as he had previously predicted, chaos overwhelmed the society and the country became so much whirled into troubles and terror that found no way to support science and art again. Abobaker Karji, mathematician and Omar Khayam, mathematician, astronomer, poet and philosopher were the most prominent figures of this era.

5.3.3.9 Khwārazm-Shāh Dynasty (177-1231)

After the Seljuqis, another Turk ruler takes up the power, Khwārazm-Shāh Dynasty. During their reign, because of their special attention to science and culture, many important scientific establishments were created in Bukhara, Balkh, and Beishabour. Khaghani and Nezami Ganjavi are two of the most prominent poets of the Persian history who belonged to this period (Zamiri, 1994, p. 54). This upward trend continued until the invasion of Mongol Empire to Persia.

5.3.3.10 Mongol Empire (1206-1368)

The invasion of the Mongols to Persia shook the bases of the Persian culture to its core again. One of the most important aspects of such changes can be seen in the great civilizations on the way of the Mongol occupation such as Persia and China which were devastated as a result of the reckless invasion and low-cultural profile of the Mongol invaders. The destruction was so devastating that the results of it was never recovered as it were before (Ibn al-Athir, 1976, p. 125).

This of course, deteriorated the path of science and culture at least for several decades after the invasion of the Mongols. In fact Mongols had no concern for books and culture and this would add to the devastating aftermath of their invasion. The only areas which were safe from the invasion and bloodshed were the western parts of the country but the rest of the scientific and cultural establishments of the day were so badly damaged that almost all the science which was gathered in them were destroyed (Ibn-Khaldun, 1974, p. 1152). No endeavor was done to undo the destructions caused by the invasion and in fact if they were lucky enough to destroy the whole land as they did with the eastern parts we can say that there would have never remained any sign of Persian Civilization and culture (Nakhostin, 1988, p. 75).

The wisdom of the local rulers and the enlightened people did not let such a scenario to take place. In fact, authors and scientists fled to take refuge in the safe areas –away from the Mongols to save the portion of culture they could carry with them(Ibn -Khavand Shah, 1994, p. 871). It was in fact, during the reign of Genghis Khan's sons when scientists such as Attar and Kamaledin Esmail were killed. But as in the case of Arabs, Persian culture and civilization started to overwhelm the Mongols and affected them to their core. *Tarikh-i Jahangushay-i Juvaini* and the *Jami al-Tawarikh* of Rashid-al-Din Hamadani are the most prominent books of this period. Hulaku Khan's order to

build Maraghe Observatory was perhaps the most single important event in the reign of the Mongols over Persia. Mohamad Shirazi, mathematician, Abobaker Farsi, astronomer and mathematician, Nasir al-Din Tusi, mathematician and astronomer, Shams Ghandi, mathematician and astronomer and Ayub Dinsati, encyclopedic were the most important figures of this era (Iqbal Ashtiani, 2000, p. 108). But, Tusi was the main architect for the survival of science in that era.

5.3.3.11 Timurid Dynasty (1370-1526)

It has been documented that Timur himself was a fan of culture and science. It has been narrated from one of his opponents, Ahmed ibn Arabshah that he has always been supportive of science and culture. He respected scientists a lot and gave priority to them at all times. (Ibn-Arabshah, 1986, p. 297) He considered himself a Muslim and apparently he was very respectful of the religious sites (Sediq, 1953, p. 469). Moein Edin Natanzi also believed that he had a special respect for the scientists and he abundantly flattered them. He is even quoted to have discussed matters such as invading new lands with the scientists and knowledgeable men (Natanzi, 1957, p. 280) ! Although his proximity with the scientists and religious figures were mostly to be used as a show off, historians agree that he had positive behavioral aspects too.

Like what was said, it has also been said that he would send the elites and religious and scientific leader to Samarqand to be close to them. He used to build many mosques and suitable places for his scientist and clergy visitors (Hosseini Torbati, 1963, p. 212). All this support though could not replace the feeling of safety and security which Timur had destroyed in the nation. His invasions and blood sheds left no room for people to nurture their spiritual and scientific potentials. He was finally crumbled in the power struggles which followed his death and the only prominent figure from his era was Ghavamedin Shirazi, who mastered astronomy and geometry.

5.4 Science and Government in Iran after the Sixteenth Century

5.4.1 Safavid Dynasty (1501-1736)

With the beginning of this era, a relative unity overwhelmed Iran which was a direct result of announcing Shiite Islam as the official religion of the country. Regardless of the centrality and the power that the central government had, the rulers were from the educated elite who had a deep eastern concern. In this period of time, the potential for math, astronomy, geometry, architecture, and other forms of science was turned into practice which shows the result of cooperation between science and religion. The booming of publishing market and educational activities which peaked in this era are documented enormously in western historian's books about that time and several reviews of the judiciary, cultural, scientific, religious, educational and governmental reviews which have been written about Isfahan is itself a clear manifestation that it could have well become a global model,(Jafarian, 2005)

Especially, the development in the field of engineering and architecture which is reflected in the civil and road construction of the time shows a magnificent heritage left from the past. This led to evolution of the 'art' of architecture to the 'science' of architecture which is very well reflected in the shapes of mosques and other monuments across the country which, are left from those days.

A good example is the acoustic features of the Naghshe Jahan and Sheikh Lotfollah mosque which still astound the visitors with its beauty and magnificence. The Ali Qapu state is also one of the wonderful examples of architecture in Isfahan in which the certain acoustic settings caused by the shape of the plaster on the walls make outside songs to be reflected throughout the building if the windows are open. Looking more precisely, we notice that the biggest innovations and magnificent beauties of the arts of

that era are in some ways connected to religion. This itself shows the deep religiosity of the creators of such masterpieces.

According to Roger Savory one of the most prominent Persian historians of the time, the Safavid Dynasty era was the most important era after the invasion of Iran by Muslims. It was the beginning of a perfectly national government which started the building blocks of the greatest civilization of Islamic Emperor. In his view, setting Shiism as the unifying factor between people was the most important aspect of this era. This led to the formation of 'Safavid Renaissance' in Iran (Holt, Lambton, & Lewis, 1970, pp. 394-429). One can say that the modernity process started in this era with the extensive relations with the West. There were countless delegations from Iran to Europe for the reason of opening gates to new worlds and such delegations led to introduction of European culture to contemporary Iranians (Jackson & Lockhart, 1986, p. 585). During King Abbas Safavi a delegation with the leadership of Sir Anthony Shirley were sent to Europe to learn the aspects of the European living and even sent people to take care of the delegates' religious matters (Bayat, 1959, p. 301) !

The most important figures of this era are: Mir Fendereski, philosopher, Mullasadra, philosopher, Mirdamad, philosopher, Sheikh Bahaie, philosopher, mathematician and astronomer, Ahmad Lahori, the architect of the Taj Mahal.

5.4.2 Qajar Dynasty (1794-1925)

Mohammad Khan Qajar was the first and the most qualified Shah of the Qajar Dynasty. He was a smart but ruthless ruler. After his death, and with the beginning of the reign of Mohamad Shah we cannot find any administrative or governmental skills in any of the royal family. Among them, Ghaem Magham Farahani was as exception who, during his more than 20 years of relentless service to the country, contributed in

countless occasions to the nation ,including: introduction of vaccination, sending students abroad, importing technology and so far. Modernization started in this period, first by introducing voluntary social developments and then by unpleasant Westernization.

5.4.3 Pahlavi Era (1925-1979)

Pahlavi dynasty was a dictatorship in the history of modern Iran which was very much dependent on the Western powers for its survival. Although there was some respect for the scientific community, but it was never a mainstream policy, rather, it was the dependence on the West which made up most of the developments which occurred at this time. In other words, he completely surrendered to the Western civilization and this was a very embarrassing situation for a civilization like Iran (Asghandi, 2003, p. 28).

One of his commitments to science was considered to be the Army of Science which was a movement to educate the illiterate peasants in far areas, although in effect it happened to be solely for historical propaganda by the regime to teach people about the past. In this highly politicized atmosphere, three different reactive movements by the intellectuals appeared: one group of foreign educated intellectuals in fact supported the propaganda by the regime in hope of bringing a basic education to the masses. The second group was the intellectuals with high ranking position in the regime who solely justified the actions of the regime. The third group was the elite who were against the measures taken by the imperial position and were in fact oppressed gradually

Ali Mohammad Hazeri, a resource on the educational matters of the past regime, believes that the education after the constitution revolution and during the Pahlavi Dynasty was in fact in hands and under direct influence of a handful mostly

Westernized intellectuals who wanted Iran to be westernized to develop. Holding a secular world view due to their education in the west, they saw development only in nonreligious education of the generation and set their goals upon this factor (Hazeri, 1998, p. 29)

In fact development in that certain era was only defined by modernism which was offered by the West and thereof the only development which was endorsed and recognized was the secular, Western-minded modernism. Religion had therefore no role to play.

5.5 Science and Politics and Government in the Contemporary period

5.5.1 Islamic Republic Era (1979-Now)

Daniel Patrice, the head of the foreign strategic studies of the United States explained the wake of the imperialist world in confrontation with the Islamic Republic in Istanbul in 1989: “we had no sensitivity toward Islam until 10 years ago, but today, it is an important factor. We have to pay attention to this phenomenon. Especially in Iran, since all Muslims in the world is copying from Iran. Iran is like a laboratory; Muslims are inspired and empowered by it. If this laboratory succeeds, then the entire Islamic world will take note. We have to notice this “(Patrick, 1991, p. 1).

Based upon “religiosity” and “science”, the Islamic Republic started in the hearts and minds of the Iranian nation and this revolution has its roots in the history and civilization of the country. In fact ,several revolutionary acts , inspired by the Islamic identity, happened in the educational system of Iran since the Islamic revolution, including: the establishment of the Literacy Movement Organization of Iran to educate the illiterate masses and the Islamization of science and scientific institutions by the Cultural Revolution during the first days of the revolution(Eyvazi, 1/1/2010). The

ultimate goal of the Islamic government is to guide the society to a high position in science and technology in which the Islamic society can be independent of any help from the outside world. Another act was the establishment of numerous universities across the country, despite the difficult conditions of the war era.

The goal of the Islamic Republic is to give positions to those with real expertise and knowledge to serve the nation, to leave judgment to the jurists and to leave the constitution to the lawyers to be protected. Science is the match point of confrontation between the West and Islamic ideology and this is the challenge whose achievement or failure has an ultimate result on this confrontation(Eyvazi, 1/1/2010).

5.6 Education since the Islamic Era in Iran:

Before discussing the relationship between science, politics and government in contemporary Iran, let us take a brief historical survey of the establishment of the education system in the Iran, this is important since it is through the education system that science gains foothold in Iranian society. One of the aspects of education in the era before the invasion of Arab Muslims to Iran was the exclusivity of the right to education to the elites. With the beginning of the Islamic caliphate, the exclusive right to study was crumbled, therefore everyone had the right to study but with the beginning of the Umayyad Caliphate this tradition of equality was abolished and new tradition of privileges to the elites started.

As mentioned above, the beginning of the Islamic caliphate in Iran changed the society and culture to its cores and education was not an exception. In fact the first change started with the altars which were changed to mosques. What is most apparent is that new scientific and cultural institutions such as observatories, hospitals, schools, academies, temples and etcetera. Undoubtedly though, mosques were the front runners

of this evolution. With rising number of researchers and students, the number of subjects offered at academies increased.

With the rise of Great Seljuq Empire, new gigantic academies, known as Nizamiyya, which were a group of the medieval institutions of higher education established by Khwaja Nizam al-Mulk, were established. The name Nizamiyyah derives from his name. Founded at the beginning of the Seljuk empire. These Ash'ari-Shafi'i theological schools are considered to be the model of madrasahs, or Islamic religious schools (Dorani, 1997, p. 67). During the Ayyubid Dynasty, Nizamiyyas became popular in Egypt and therefore, were spread across the country. They were welcome with luck and many kings and even merchants dedicated their share to the establishments (Keshavarzi, 2003, p. 52).

With the rise and widening of the Islamic Empire the rulers looked for Iranian expertise in ruling the lands. This was prominent during the 2nd century when the Iranians had a greater role in power during the Abbasid Caliphate. It coincided with the rise of the House of Wisdom (Arabic: Bait al-Hikma) which was a library and translation institute in Abbassid-era Baghdad, Iraq. It was a key institution in the Translation Movement and considered to have been a major intellectual center of the Islamic Golden Age (Vakilian, 1999, p. 53). This was the beginning of an era in which nonreligious education lost its appeal and modern artistic and cultural studies had little support. This educational system which stretched from modern Uzbekistan to Egypt lasted from 1050 AC to 1250 AC (Hawza, 2000, pp. 100-112).

5.7 Modern Education in Iran:

Modern education in Iran started with Safavid Dynasty.

5.7.1 Safavid Dynasty

The introduction to Iranians of the modern sciences such as industry and western civilization happened in this era. This was the beginning of a new era of western education which was mostly carried out by western missionaries and it is considered to be the beginning of the modern education in Iran(Dorani, 1997, p. 125).

5.7.2 Pahlavi Dynasty

Many acts of modernization took place in Iran during the Pahlavi dynasty which was very much affected by the global trends which were shifting in the world. One of such changes was the modernization of education agenda in Iran during the 1920s and the 1930s. Laws and amendments were passed in order to solidify a secular education in academies and institutions, as well as to guarantee a free education for all.

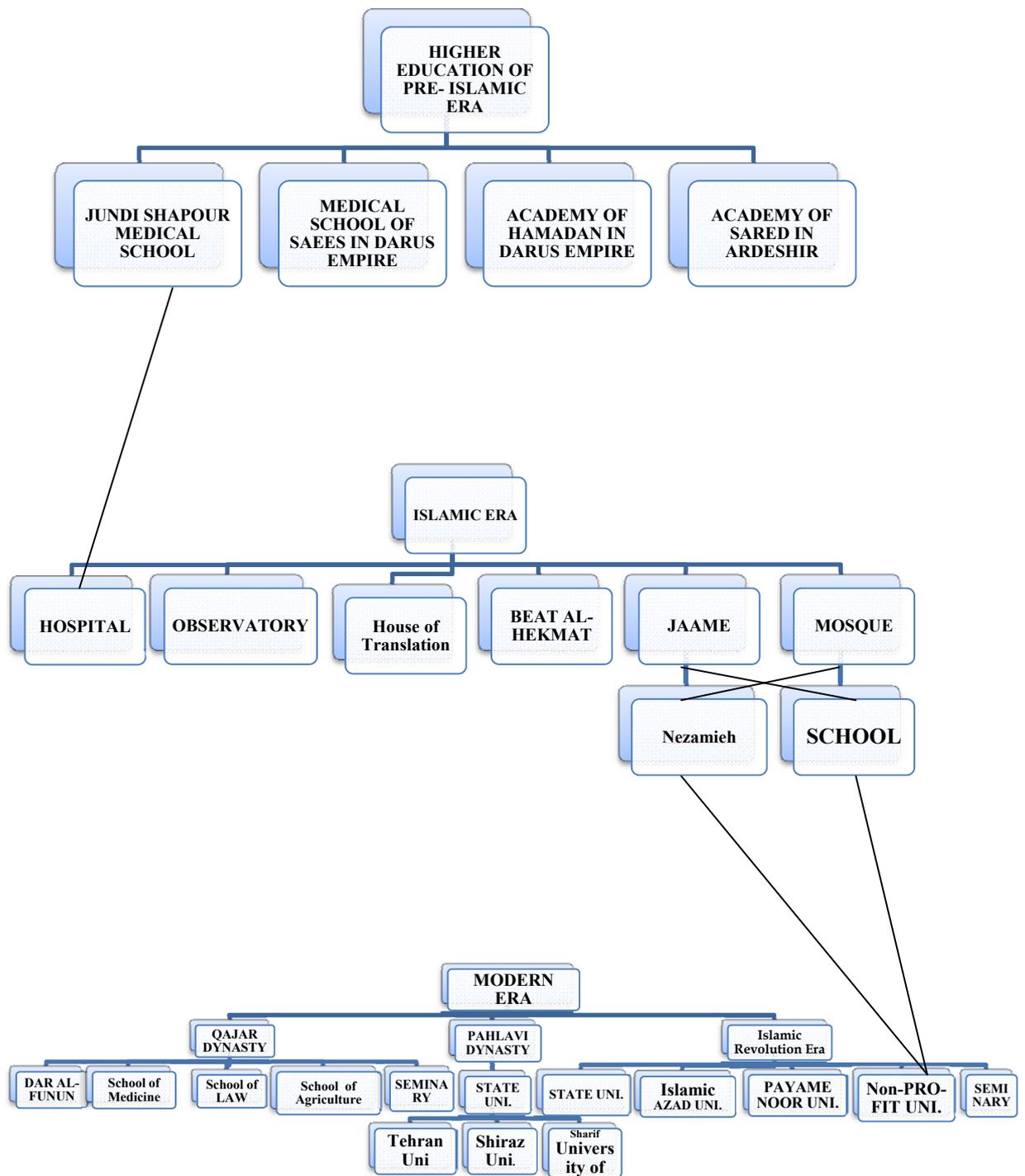
Also, the High Council on Education was established to supervise the educational matters and establishing the new educational agenda. This council therefore decided that the educational system of the European countries be selected as the standard form of the national schools. Finally, the French model was chosen (Hamraz 1997, pp. 54-55).

Shah Reza Pahlavi was the main contributor to the modernization of education in Iran. His first step was to demolish all traditional schools known as Maktabs in which pupils (excluding girls) were taught religion and writing and reading. Shah Reza ordered everyone to go to new government schools and study the formal educational materials. He later on publicized all the missionary schools nationwide. It is recorded

that it was only in 1941 that the National Parliament passed the free-education-for-all act and from this time the academies and educational institutions took a formal and institutionalized form.

One of the great contributions of this era was that it allowed the German missionaries to teach Iranian students in technical institutions. The vocational schools started and they were later on affiliated with the University of Tehran.

Fig 5.1 : Higher Education System in Iran: Pre Islamic, Post-Islamic Era and Modern Era



5.8 History of Higher Education in Iran:

The modern higher education in Iran has a 100 year history, although the tradition of higher education in Iran dates back to the Sassanid Empire.

5.8.1 Pre-Islamic Era:

As mentioned before, Nusaybin was one of the most central scientific establishments of the ancient era. With the development of science in other parts of the world specially in India, the number and the prominence of the institutions of higher education started to grow (Hill, 1993, p. 4). One of the very important scientific institutions established in the ancient Iran was the Jundi-Shapur Institute which was founded by Ardeshir I, founder of the Sassanid dynasty in 208 AC. For centuries it was the main pole of medicine, pharmacy, veterinarian, philosophy, astronomy, math, rhetoric, logic and etcetera.

5.8.2 Post-Islamic Era:

It was not until the Great Seljuq Empire in which the contributions of Nizam al-Mulk, better known as Khwaja Nizam al-Mulk al-Tusi (born in 1018 – died on 14 October 1092), the scholar and minister of the Seljuq Empire, led to the establishment of new scientific and educational institutions. He established a chain of Nizamiyyahs (a group of the medieval institutions of higher education) during the fifth century of Islamic age. The most prominent of those institutions are Saeedieh and Beihghie in Neyshabur, Balkh, Herat, Amol and Isfahan. In them, students studied *Fiqh*, *Hadith*, interpretation of Quran, math and medicine (Afzal, 1969, p. 2).

This was the successful example of new life of education in Iran after Islam which became a building block for the development of other institutions in the years after. These institutions were financed by the fees which were intended at the students

and this fee would be enough for maintaining and development of the establishment. The most prominent scientists of this era include Avicenna (980 - 1037), Ghazali (1058–19 December 1111) , Nasir al-Din al-Tusi (18 February 1201– 26 June 1274, Saadi Shirazi (1184 – 1283/12910 and many more.

Meanwhile, Nasir al-Din al-Tusi established a gigantic library including 400,000 books from all around the world as well as a huge observatory in Maraghe, Neyshabour. Hulagu Khan (a Mongol ruler who conquered much of Southwest Asia) is said to have financed these establishments (Nasr & Leaman, 1993, p. 542).

Unfortunately, with the decline in national peace and unity the pace of science in Iran started to deteriorate and with the Mongol invasion of Iran began in 1219, and it completely stalled. Until the beginning of the Safavid Empire in 1502 which marked the beginning of the Golden Islamic Age in science and art. One of the most important factors of the high speed development during this empire was the national unity which was the result of unifying the religion of the people. Even the Jundi-Shapour Institute ceased to be a governmentally financed scientific establishment at the middle of the Safavid rule (Tayeb, 1974, p. 5). As mentioned before, the Shiite Islam was the unifying factor in Iran when Safavids came to power. In the religious establishments of the time Shiite fiqh and hadith was taught relentlessly and many scholars were educated during this time.

5.8.3 Higher Education in Modern History of Iran:

With the beginning of the age of communication and commerce, the idea of establishing modern educational and scientific institutions was born in the Qajar Dynasty in 1794. It all started with Dar al-Funun , established in 1851, the first modern institution of higher learning in Persia. It was founded by Amir Kabir and it was

considered to be a poly-technique at first (Dorani, 1997, p. 129). He had been schooled in Russia and Turkey and felt the need to a modern educational system for educating a new generation of experts to run the country. He first intended to introduce science and engineering to normal people. Therefore, the institution started with engineering, pharmaceutical sciences, medicine, fighting, mining as well as history, geography, natural studies, math and etcetera.(Shabani Varaki & Mohammadi Chaboki, 2008, pp. 17-49)

He believed that international lecturers have to keep their distance from politics and concentrate on teaching only. This is the reason behind his interest in hiring lecturers from Austria, rather than from Russia, France or Britain, where it had benefits in Iranian politics.

Amir Kabir was blackmailed, crumbled and assassinated by the order of the King, and after a period of 50 years, the institution was almost deteriorated. After the Persian Constitutional Revolution and with the inflow of French lecturers, the institution gained its weight again and played a huge role in introducing the western culture and civilization to the Persian people (Hashemi Rafsanjani, 1967, p. 137).

The first official university in Iran (Tehran University) was founded in 1928 by Shah Reza Pahlavi. The building blocks of this university were based on the French model of education and even the design of the university followed a French tradition (Adle & Marefat, 1992, p. 106).

After the Second World War, Shah Mohammad Reza Pahlavi the successor of Shah Reza Pahlavi decided to shift gradually from the French to American standard of education. Based on this decision, he tried to attract the attention of the American academia to the Iranian educational atmosphere. In 1960, Shah Mohammed Reza

Pahlavi, invited University of Pennsylvania president Gaylord Harnwell to come to Iran and examine Iran's higher education institutions. Harnwell prepared a report at the Shah's request, entitled *A Pattern for a New University in Iran*, and the Shah subsequently decided that University of Pennsylvania would assist the Iranian government in transforming Pahlavi University into the only institution in the Middle East based on American-style higher education. The University of Pennsylvania thus became highly influential in shaping many of Pahlavi University's departments and institutions.

5.8.4 Education in Iran after the 1979 Revolution

With the occurrence of the revolution in 1979, the High Council on Cultural Revolution took the responsibility to re-establish and to reform the educational system in Iran. As of the acts passed during the 1980's in the parliament, all children aged between 7 and 18 are eligible for free-for-all education in governmental schools and institutions. Vocational and technical schools are also available for those who are interested, as those who are interested in higher education can proceed to university degree upon sitting for the university entrance examinations.

5.8 .4.1 The Cultural Revolution

The Cultural Revolution (1980–1987) was a period following the 1979 Islamic Revolution in Iran where the academia of Iran was filtered of Western and non-Islamic influences to bring it in line with *Shia* Islam. Currently, the Iranian educational system has many students in first degree, second degree, PhD and doctorate. There are 400 educational and research centers in Iran which work in governmental, private, and distant study areas.

5.8.4.2 Higher Education Authorities in the Islamic Republic:

This part divided into two broad categories:

5.8.4.2.1 Council on Iranian Cultural Revolution

As the highest policy maker in the educational matters this council has the following authorities:

- a) Evolving the educational atmosphere and cultural backbone of the society in line with Shiite Islam interpretation;
- b) Spreading and enforcing the Islamic teachings in the society;
- c) Spreading scientific and cultural incentives in line with Islamic *Sharia*;
- d) Protecting and spreading the Islamic and national values.

5.8.4.2.2 The Organization and Government of science and Technology in Iran:

Its most important duties are:

- a) Developing, suggesting and enforcing agenda on all the educational and research institutions and guaranteeing cooperation between them;
- b) Defining the overall policies of the ministry;
- c) Setting the rules and regulations on hiring, enrollment, and employees' benefits which are previously set by the related authorities;
- d) Funding the universities and public institutions with the cooperation of the Ministry of Finance;
- e) Planning for educating experts in the areas of research and development;

- f) Setting rules and regulations on scholarship students and hiring them;
- g) Funding research and development funds for applying institutions;
- h) Running random auditions to the institutions of higher education in Iran;
- i) Certifying and assessing the foreign educational institutions;
- j) Permitting new institutions to be established or discrediting the disqualifying ones;
- k) Managing the permanent seat of the Islamic Republic in UNESCO.(Ministry of Science, 2010)

5.9 Science in Contemporary Islamic Republic of Iran

Iran has always been a cradle of science for all its history and since the beginning of industrial revolution in the West; Iran has always been active in the direction of industrialization. This process took place during the Pahlavi era in which access to science and technology was fast and easy, but at the expense of self-belief and independence in both scientific and cultural aspects. With the rise of the Islamic Revolution in the 1970s and the beginning of self-awareness and religiosity in Iran, a fundamental shift in the mentalities of the Iranian people started to take place as a result of which huge revelations, both in quality and quantity, started to happen in the scientific and religious arenas. The Islamic revolution happened as a result of endeavors of believers and revolutionaries with an emphasis on Islamic values and a belief in a return to self and the real identity of the Iranian people. The main concern of the Islamic Republic is to manage the different social and economical needs under the supervision of the Islamic values and principles.

One of the clear indications of the importance of science in the Islamic Republic is its Constitution in which a heavy legal allowance has been put to support research and

science and the lawmakers as well, have a priority to pass laws and regulations which legally support scientific revelations and contributions and protect the Creator's rights.

The Constitution has in itself several occasions which do so, to be named are:

1- In the 1st and the 2nd Amendments to the 1st Principle of the Constitution it reads: "The Islamic Republic functions on the bases of belief in the necessity of following Allah obtained by (a) the Holy Text and *Hadith*, and (b) scientific and technological shifts of humanity." (Article 2) Clearly it is impossible to profit from scientific and technological shifts without research and study.

2- The 2nd and the 4th Amendments to the 2nd Principle of the Constitution necessitates:

The 2nd: "The general knowledge of public by the right mixture of media and press." (Article 3, 2nd Amendments) The 4th: "Emphasizing on the importance of research and creativity in scientific, technological, cultural and social aspects by supporting scientific and cultural institutions and by awarding researchers." (Article 3, 4 Amendments)

Based upon this principle the Islamic Republic is required to use all the necessary resources to encourage creativity and research.

3- The 24th Principle of the Constitution indicates that the press and the publication are to publicize anything unless it is against the Islamic principles and/or public/national interest. It's needless to say that the freedom of speech plays a very major role in development of creative and critical thinking in a society.

4- The right to free, compulsory education has been guaranteed under the 30th Principle of the constitution until the age of 18 and to support free higher education up to the point of independence of the country. It is clear that illiteracy is the biggest obstacle to read and research and one of the first and most important responsibilities of the Islamic

government is to tackle this problem and to raise the knowledge of the public specially the kids and alike.

5-The 1st and the 3rd Amendment of the 43rd Principle of the Constitution declares that the economics of the Islamic government should be in a way that supports and helps the nourishment of the educational potentials of the public.

6-the 141st Principle of the Constitution has prohibited people from having more than one public-sector job and has emphasized the role of research and non-stop learning in the career life of individuals. This suggests that even as an executive manager in the public sector, a person needs to read and do research and being needless of reading and nourishing has no practical meaning. Everyone needs to read and should do research and examine their respective field of responsibility.

By surveying the different Principles of the Islamic Republic's Constitution we can learn that:

(a) One of the necessities to reach to the goals of the Islamic Revolution is learning the principle of the science and technology which is impossible to achieve unless by supporting research and development in the country.

(b) One of the responsibilities of the Islamic Government is to guarantee the rights and the privileges of the academic societies to support research and development and to nourish creativity. Therefore the Islamic government is required to allocate funds and support for this aim.

(c) The government is required to set required economical policies by which the financial concerns of the academic society be eased and the obstacles as such are eliminated to support and encourage the soul and determination to create and research.

(d) Reminding the executive managers of the country that everyone needs to study and keep nourishing and nothing can and should be an obstacle to research.

(e) The Constitution has an emphasis on spreading scientific institutions and scientific journals.

The Islamic Revolution of 1979 happened at a time when both modernism and secularism were being spread very fast around the globe. In spite of this, the revolution happened under a totally Islamic constraint. Since the beginning of the modern education in Iran in the 1800s, up to a century after that, the Iranian educational system was occupied by foreigners (Hazeri, 1998, p. 29). The Islamic Republic tried to fill their place with revolutionaries. The intention to 'revolutionize' the country was in itself a very heavy weight for the new Islamic Republic and there could be nothing worse than the imposed war of 1980 and its impact upon the Islamic Republic. In spite of all of this and the numerous problems that such events have created for the Islamic Republic, many skills and abilities have risen out of necessity. Sanctions were not an obstacle, but they were merely harsh measures to encourage self-belief and creativity. It has not stopped Iran from obtaining nuclear power, stem cells, nanotechnology, and so forth. On the other hand, the war was not as late Saddam Hussein once suggested a 'three-day' war, but one which led to independence of many industries and capabilities.

Such experiences have had enormous effects on people one of which is strengthening the power of Islam in people's hearts and minds. One of the first actions taken after the revolution was to fight illiteracy. In 1980, when around 75 percent of people were illiterate, Ayatollah Khomeini ordered the creation of the Literacy Movement, and this was the beginning of the Cultural Revolution in Iran, by the direct order of the leader in 1981. It coincided with the expansion of higher education among

the youth: The first entrance examination for the Islamic Azad University (a chain of private universities in Iran) took place in 1981. Ali Mohammad Kordan believes:

The establishment of the Islamic Azad University was one of the decisions of the Islamic government to expand the quality and the quantity of available study opportunities (Jahanbegloo, 2000, p. 63).

Overall, the number of universities across the country has had a sharp rise. To this should be added the expansion of the infrastructure of the current facilities and the number of offered programs and students. The number of students has risen from 250,000 to 1,200,000 in a period of just a decade. This steady rise was never delayed by the war and its consequences (Mansouri, 1999, pp. 142-143).

In spite of heavy expenses required to offer the nation a modest educational infrastructure, it was a very necessary, inevitable cost; otherwise, the heritage of the former regime would be an obstacle to the goals of the Islamic Revolution. This truth roots in the reality that the supply and demand were not balanced during the Pahlavi era. Besides, the education offered in that era was not suited to the requirements of the society (Asghandi, 2003, p. 31).

One of the problems of the current educational government of the Islamic Republic is that the ratio of educational expenditure to the total national gross income is not even up to the ratio of most developing countries. This shows disrespect to the academic society of the country. The present leader of the Islamic Republic has a deep concern regarding the issue:

The compensation to the mismanagement and insufficient growth [in the past] lies in today and tomorrow. The elite [class] should take scrutiny and research very seriously and their endeavor is expected to override what is required from them. Increase the volume [of work] and use every single opportunity. Study and study accurately. Do not be satisfied with the minimum required, and [further] study... Up to 20-30 years, don't say it's too much [it isn't](Khamenei, 1998, pp. 4-7).

Such concerns have had a strong effect on the situation, although the growth has not been linear and sometimes quality has not caught up with quantity in many areas. The feedback from the academic elite can have a huge impact on accrediting the endeavors in this area.

Reza Mansouri writes in an paper:

Professional research is very new in Iran. Before the Islamic Revolution only 3 percent of the physicists were actively engaged with research. The total number of articles therefore did not even reach 200 a year. Based on the research incentives and impact Iran was not among the top 25 developing countries, but after the [Islamic] Revolution things started to change. This year the number of articles produced by Iranian scientists surpasses 1000 and one of those articles attracted more than 100 citations (Mansouri, 2004, p. 240).

Ali Mohammad Kardan answer to the question: What are the impacts of the West on the Iranian educational system said?

The goal of the anti-Westernization of the country after the 1979 [Islamic] Revolution is avoiding the negative aspects of the Western civilization and attraction of the technological and scientific gains. In spite of that, this acceptance is not a form of closed-eye imitation which is encouraged by the academic society (Jahanbegloo, 2000, p. 63).

Shapour Etemad has done another valuable piece of research on the outcome of the scientific portfolio and activities of Iran between 1970s and 1992. He believes that the scientific research in Iran has in fact decreased during the peak of the Islamic Revolution and this process had its worst effects during the hardship of the sanctions in the 1980s. In spite of that he believes that we are currently at a proper position relative to the days before the revolution:

The number of articles published in 1991 (1370) is approaching its peak in 1973 (1535). With the establishment of many doctoral courses during the recent years we can easily hit the proper level in a short time. There is still a good place to ask whether we have really lost anything do far or not...(Etemad, 1999, p. 43) ?

A few years later many things had changed, to the extent that when he was asked about the situation of the educational centers around the country, he answered:

By considering the historical context of events, we are at a proper position relative to the pre-Revolutionary era—specially in the fields of engineering and medical sciences. We can now say that we have completely overcome the sudden fall in scientific research as a result of the imposed war. In fact we are now at a position in which we are doing far better in these fields, compared to the past. From a statistical point of view, in the days of peak oil prices the investment in universities soared for a year or two between 1978 and 1979. As a result, the scientific papers produced in one year reached to an unexpected height, but in the decade which followed, the fall began and the rise that followed the end of war ended in today's 400% increase in number of scientific papers to a historical 2000 papers a year, and still projected to increase (Etemad, 2003, p. 14).

Therefore, we conclude that in spite of all the problems ahead, the production of science in Iran is on its right track and is continuing its strong rise very smoothly. Faced with the question: Why have we not reached the developed world if the pace of scientific research is very fast? He replies: That's the issue. It is fast, very fast, but not steady enough [yet]. Try to relate this to earlier discussions about the views of Iranian's religious intellectuals on the importance of science within an Islamic polity.

What is the religious justification (legitimizing) for science within a democratic Islamic government?

Among the politicians of the Islamic Republic the priority is to reach to a point where we are producers of science not merely importers. One of them has said:

We know no boundaries to hit. We aim for the sky. Our goal is not just gaining science, but spreading and developing it. We tend to accept that science is with others, but we want to change that mentality, by changing the role of university [from just teaching to producing]. For reaching this aim we need to shift to a more defensive phase not a passive, relative one (Mansouri, 1999, pp. 265-266).

Overall, these are a selection of necessities to reach to scientific goals of the Islamic Revolution:

1-Recognizing the right to think and act upon: Perhaps one of the most important results of the Islamic Revolution is the revival of the self awareness and national identity and self steam among the Iranians for this important result that Iranians have the power to think and to act upon the result. What is therefore needed now the most is

to strengthen this idea by creating proper atmosphere to nourish the potentials, and the significance of hard work should not be forgotten as well as it is quoted in Sura Najm (Quran,53:39) : “And that there is not for man except that [good] for which he strives.”³ But the important thing is how much actions are put upon the Islamic principles: “It is not the matter of how comprehensive Islamic faith is; the important thing is how to use *this comprehensibility*.” Mohamad Javad Larijani reminds us.(Larijani, 2001, p. 95)

Therefore, only by creating enough support, proper atmosphere, and the creation of a steady flow between thought, action and execution which can lead to creativity and productivity.

2-Understanding the difference between societies and their needs: The Western civilization has failed to globalize its culture to all over the globe and this a reminder that every society needs its own identity and it has been the path among the Iranian politicians to emphasize on the Islamic identity and this means relating this to discussion of religious intellectuals in separate section. It is impossible to be at odds with the needs of the society when setting rules or policies for it.

3-Putting together *Hawzah* and University: These are the two major institutions with which every Iranian is in touch. Therefore when we talk about scientific breakthrough we definitely mean in both the directions of *Hawzah* and university. They both have their own philosophy and have to work independently but in a cooperative way. What matters most is their proper division of responsibilities in producing the Islamic science in the production of which both need one another.

4-Maintain a critical and technocratic view toward the modern science and technology: It is needless to mention that the precondition to this is Islamic science. In

³ "وَأَنْ لَيْسَ لِلْإِنْسَانِ إِلَّا مَا سَعَى"

fact, the more we become aware of the modern world, the more interested we become in actions towards more and more of it [knowledge]. Dr Mehdi Golshani believes: “Teaching the philosophy of science and sociology of science under the light of Islamic world view is necessary”(Golshani, 1998, p. 179).

5-Creating and maintaining proper concepts suited to the current situation of the country: This is especially important when approaching the liberal arts and humanities. Concepts in humanities are the tools of interpretation and because of the religious backbone of the Iranian society, government interpretations should take up a religious outlook because The Western concepts which lack the element of religion cannot be used in interpreting a religious society.

6-Creating and strengthening the scientific institutions between *Hawza* and university: Such institutions have to be the place of gatherings and discussions for researchers and rhetoricians and there should be a proper space for discussing professional issues regarding different fields. In this way the scientific society will gain a better idea of its potentials for a more meaningful and correct form.

7-Emphasising on interpretational and combinational methods in scientific research: Monotheism is the main principle of the Islamic faith. Proficiency, on the other hand, is the main principle of the modern science. Although science has had very positive impacts by its existence, but it is still not the aim. The real goal of science is unifying the meaning of so divided and wide range of knowledge into one channel to know the only Divinity.

Late Mohammad Taghi Jafari has written extensively on the matter:

It seems to me like abounding any of the two [science and Divinity] for the sake of the other has led to division from the law of knowledge: the necessity to

analyze and look holistically. We should remember that not all analytical scrutiny is science, nor is all holistic methods a part of philosophy (Jafari, 2000, p. 89).

5.10 Conclusion

The important and critical role which is played by the governments in setting policies friendly to producing science in a country is one of the themes which were repeated in this study. As proved in the lines above, the process of producing science is to a great extent dependent on the policies and the rules which are in practice. In the section related to the essence of governments and its meaning for scientific research we explained the democratic and dictatorial regimes in their own separate forms. In dictatorial regimes, as a direct result of closed societies, and political oppression and the lack of freedom, there is almost no potential for the enhancement of science and research. On the other hand, in democratic nations, as a result of open societies and freedom of expression, there is much space for scientific research and investigation. In several former Iranian governments there have always been a number of patriotic, efficient officials, despite the fact that the governments were corrupt, who took positive actions in spreading scientific thinking. In history, wherever there is a trace of dictatorship and ignoring the science and scientific figures, we see a decline in the power of the rulers. A good example is fall of the church in Europe. In trying to find out the reason behind our status as an underdeveloped nation we need to consider the factor of the dictatorial regimes in the recent and the far history of Iran. The apparent fact is that with the rise of totalitarian powers in Iran and the fall of the Islamic civilization the development of science and scientific research stalled. On the other hand, with the rise of free and democratic rulers, and by providing the necessary needs of the educated class we can see a rise in the rate of scientific development in the country, thus

attracting the best minds. Dictatorships have always resulted in brain drain and a downfall in scientific research in the country.