Reviving the Institution of ‘Science’ in Islamic Civilization after Mongol Invasion: The Case of Tabriz Rabe Rashidi University

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Abstract

The Mongol invasion caused great devastation and significant social change in the eastern parts of the Islamic world, where scientific organizations did consequently suffer irreparable damage. Using ahistorical-comparative method, the present paper purported to study the model of reconstruction of scientific organizations in post-Mongol invasion era in Iran with emphasis on Rabe Rashidi University of Tabriz. Given that the institution of ‘science’ for flourishing and sustaining the continuum of progress requires the constant presence of a conducive social and political context as well as economic foundations and institutionalized knowledge-oriented values in society, after the Mongol invasion and positioning of Tabriz as a political center and capital city, Rashid al-Din Fazlullah Hamadani in the capacity of Ilkhanid chancellor expended a great deal of effort to contribute to the development and management of each of the afore-mentioned elements. He aptly combined and augmented the efficacy of the then available ‘raw materials’ via molding them into an educational organization and reframed the dispersed and informal endowments into a formal academic organization to be utilized by the educational departments and all those involved in Rabe Rashidi. Preparing a conducive educational environment, delineating organizational goals, organizing the space and time of the training groups, developing educational curricula, planning for the methods and quality of teaching, managing classes, and assigning students into cohorts according to their talents and interests were some of the management skills of Rashid al-Din, just to name some. The accomplishments of Rabe Rashidi University in acquiring Chinese and Mongolian sciences and integrating them into the legacy of Islamic sciences besides its special relationship with Byzantium had made Rabe Rashidi one of the channels for the transfer of Islamic knowledge to Europe.

Introduction

Unlike the Middle Ages which is referred to as the epoch of darkness and decadence in the West, the same era is proudly seen as the ‘golden ages’ and ‘the dawn’ in the East. It was during this time that Muslims presented themselves as vanguards of knowledge and civilization in the world and laid the foundations for several sciences today known as algebra and trigonometry, scientific geometry, chemistry, etc. One of the factors that brought the boom and dynamism of Islamic civilization to standstill was the traumatic Mongol invasion. The two long-term and massive invasions of the Mongols and the Crusaders from the west and east sides of the Islamic world, lasting for about two hundred and three hundred years respectively, rendered the Muslim world incapacitated and left indescribably vast ruins and destructions. In fact, what Muslims had acquired from Islamic culture and civilization in Egypt and Syria was decimated by the Crusade invaders and what they had constructed in Transoxania, Khorasan (formerly Marv) and Iraq were pulverized by Mongols. This invasion began in 616 AH (1220 AD) and ended in 656 AH (1260 AD) with the establishment of the Ilkhanid government in Iran. The Ilkhanates were practically dismantled by 736 AH (1336 AD), with the rise of Tamerlane and his successors in western Iran with Maragheh, Tabriz and subsequently Soltaniyeh as their capitals (Velayati 2010, 4). Ibn Khaldun asserts that:

*By that time [Mongol invasion], sciences were at their zenith in the eastern part of the Islamic world, and civilization and advancements were quite well-established in Persia and in its states such as Khorasan,*
Transoxania and Iraq. However in the wake of the invasion, these territories fell into ruin and consequently civilization and prosperity as originating factors of knowledge and industries started to fade away (Ibn Khaldun 1995, 1151-1153).

The present paper aims to address the factors contributing to the creation and evolution of science in Islamic civilization with a particular focus on Tabriz Rabe Rashidi University as an example for the institution of science in Islamic civilization. It is intended to explore how Rabe Rashidi University revived the scientific heritage of the Islamic World after severe destructions inflicted by the Mongol invasion and how it could lay the foundation for one of the most important scientific centers in heavily-destroyed Iran, giving rise to the emergence of new intellectual and knowledge-guided life based on Islamic civilization in the time of decadence.

Social Context of Formation and Flourishing of Rabe Rashidi University

Irrespective of its technical connotations and implications, 'science' is a social manifestation that like art, literature, law, and religion quintessentially relates to social, political, and economic circumstances as well as to the prevalence and domination of certain ideas, ideals and purposes in a given period of time. Therefore, the role and function of the socio-contextual factors in civilizational development should not be seen as irrelevant and subsidiary. In fact, the evolution of a scientific thought is intimately linked to the evolution of the society and the context in which the 'thought' has matured (Rousseau 1946, 17-18). The growth and development of 'science' in Islamic civilization has been reliant on three fundamental components: 1. Contexts (political, economic and social); 2. Knowledge-oriented values (cultural factors), and 3. Educational management.

Political Context

A scrutiny of time sequences to identify the factors leading to the formation of Rabe Rashidi University indicates that the institution of science was systematically integrated into Islamic civilization, but scientific centrality and authority in each period was basically contingent upon political centrality: e.g. Baghdad, Andalusia, Isfahan, Samarqand, Tabriz and Istanbul. The emphasis on temporal processes (chronologic processes) as the mechanism of explanatory variables on the dependent variable (i.e., Rabe Rashidi) makes it clear that after the Mongol invasion of East of the Islamic world and their establishment in Azerbaijan, this region assumes political centrality. After the conquest of Baghdad and termination of the Abbasid Caliphate by Hulagu Khan (656AH/1260A.D.), the massive Abbasid legacy is transferred to Maragheh, thereby providing the ground for the formation of the Maragheh Observatory (657AH/1261A.D.). Furthermore, the vast realm of the Mongols stretching from China to the Mediterranean as well as the facilitated communication between the principal custodians of civilizations played a significant role in the expansion of science and science centers. Tabriz Shanb Ghazan Complex was created in 694AH (1296A.D.) to serve such a purpose. After Sultan Mohammad Khoda Bandeh (Uljaytu) (703-716AH/1304-1320A.D.) ascended to power, his chancellor, Khajeh Rashid Al-Din Fazhullah Hamadani, found Rashidi town (703AH/1304A.D.) in Tabriz.

One of the responsibilities of an Islamic government is to protect religion, life, wisdom, honor of families and wealth of the people and since the legitimacy of government is inferred from Islamic texts, it enjoys a value-driven approach and system along with other institutions (Al Ghanooshi 1993, 23). In fact, through fulfilling the material needs, providing security and allocating free space for scholarly activities, the caliphs and the rulers in Islamic civilization could trigger a ‘revolution’ in a part of this civilization. Muslim scholars have perceived performing scientific activities as equal to performing a religious duty and worthwhile of rewarding for the Hereafter. The status of scholars was honored as for prophets and the caliphs also offered them substantial rewards. For example, the Abbasid caliphs remunerated the translators by giving them gold, the same weight of the translated work (Al Hassani 2012, 17).

The noticeable point about that period is that the Mongols conquered the political establishment in the East of the Islamic world, whereas they personally lacked such a political and cultural paradigm that could enable them to support knowledge and scientific centers. Rashid Al-Din describes Mongol’s customs in Jame
Al-Tavarikh as follows:

Mongols were Bedouin and half-savaged people and away from any civilization and their rules and customs signified their desert-roving life. Procuring food and ranching was the main goal for a Mongol’s life. During the time of Ogedei Khan, his father sold him to the Emir of Jalayer tribe by taking a groin of cow in return at a famine year. Incest marriage was one of the manifestations of their Bedouin nature. Superstitions were the most prominent symbol of Mogul thinking: they resorted to Jadamishi upon day of poverty and necessity and it was a stone they believed if they put it into water and washed it, wind, cold air and snow and rain would immediately emerge even at the heart of summer’ (Rashid Al-Din 1958, 97).

Nonetheless, what paved the way for the political support towards ‘knowledge’ during this period was the change in vision and thought of the Mongols. The change occurred when they found themselves weaker in every way than their defeated enemy. Thus, by changing their religious beliefs, they adapted themselves to Islamic community and culture. In his historic analysis, Abolhassan Nadavi describes two historic phases and historical experiences in Islamic communities before the period of conquest by the West:

The first experience occurred during the first and second Hegira centuries (7th and 8th AD) when the Islamic community was young, vigorous, filled with a novel philosophy of life and talent and progress and it was coupled with a movement constantly on the path to struggle and victory. Quite the contrary, the two great ancient civilizations (i.e., Roman and Greek civilizations to the west and Persian civilization to the east of Islamic civilization) were full of knowledge, industry, culture, literature, philosophical systems, and the most advanced practices of civilization and society. However, Islamic community was not only free of any sense of inferiority, but also it was replete with self-belief and self-confidence; it adopted certain dimensions of their ‘treasures’, which were compatible with its temper and nature, thereby fulfilling its needs without suffering any intellectual slavery, blindfolded followership, fear and intimidation. In fact, owing to its independence and presence of a leadership, these gleanings and limited borrowings did not adversely affect the spirit, approaches and ethical tendencies of the Islamic community (Nadavi 1968, 40).

In the second experience Muslims were militarily defeated and politically subdued by the Mongols, and the Islamic community was left to the mercy of an impecunious conqueror devoid of civility, knowledge, industry, laws and legislations in civilization. Having no civilization and philosophy of life, the conqueror was in a primitive state of civil, social and intellectual development. Hence, the surrender and submission of the Islamic society to the civilization, life philosophy, thoughts and values of the Mongols sounded meaningless. In fact, it was the conquerors that were increasingly influenced by the vanquished and increasingly embraced the color of civilization, civility, knowledge and sciences, progressive lifestyles, inspiring culture and appealing customs, divine beliefs and transcendental ideas. In the end, the conquerors were entirely assimilated into the religion and civilization of the conquered (Ibid, 42).

Regarding the effect of Muslim instructors on Mongol princes, who had converted into Islam, Rashid Al-Din Fazlullah wrote: "Anandā - the descendant of Kublai Khan became a Muslim for this very reason. It was not long afterwards that he converted one-hundred and fifty thousand soldiers of his army to Islam and conducted Islamic circumcision on young Mongols." The anger and harshness of Timur Khan also failed to deter him from becoming a Muslim and practicing monotheism. Of course, the well-known story of conversion to Islam and destruction of idols by Mahmud Ghāzān also influenced Anandā’s steadfastness and persistence in Islam. Later, his rulers became Muslim and he built temples and mosques in camp sites and settlements (Nasr 1971, 418-419).

Having converted into Islam after ascending to the throne, Sultan Ahmad Tekudār even sent Qotbeddin Shirazi, a man of knowledge and wisdom, on a religious mission to Egypt. The most prominent manifestation of Islam’s growth and prosperity was evident in Ghazan period. In the history of Mubarak Ghazani, one can see how the Mongols were converted to Islam following the conversion of Ghazan. In the History of Mubarak Ghazani, one can see how the Mongols were flocking to convert to Islam after Ghazan became a Muslim. From then on, Ghāzān Khan turned to "vows and alms for the poor and needy" as well as "visiting divinely charismatic persons and tombs of dervishes". It was early Shaaban month in 694 AH (2nd half of
January 1295 A.D.) that Ghāzān Khan uttered Unitarianism credo in the presence of Sadreddin Ibrahim—son of Saadeddin Hemawi—following his lengthy conversation with him about the facts of Islam. According to Rashid Al-Din Fazlullah, he [Ghāzān Khan] performed fasting in Ramadan instead of worshipping idols. Also, many Arabs and Turks were invited to his court at the time of Iftār each night in Ramadan to break their fasting. Conversion of Ghāzān Khan to Islam saved the religion from weakness. He framed Ghāzāni Yāsā (Mongol’s law) and Islamic principles became prevalent and replaced Genghis’s Yāsā and teachings which were rigid, savage and primitive. The Ghāzāni Yāsā— as meticulously described and widely praised by Rashid Al-Din Fazlullah— was better and more civilized than former Mongolian customs and rites. There should be no doubt that Ghāzāni Yāsā was codified under the influence of Islamic civilization and with the contribution Rashid Al-Din Fazlullah (Ibid, 419-422).

The governments’ role in the growth and development of ‘science’ is mainly recognized to be facilitation and provision of a suitable context. However, in formulation of the reasons for the flourishing of ‘science’ in Tabriz in that period when the rulers (i.e., the government established by the Mongols) were culturally weaker than the ruled highlights two interrelated theories that must be considered in the entirety of Islamic civilization: the first is the administrative (bureaucratic) system because the Ilkhanids were born out of the wilderness and were consequently unaware of urban life and the administration of government affairs, so they adopted the administrative system of the Islamic civilization, which in turn leads us to the second issue: the role of the political and cultural elites who directed this adoption process.

Hulagu Khan (1256-1265 A.D.) appointed Khajeh Shams Al Din Mohammad Juvayni to administer governmental affairs. Abuqa Khan (1265-1282 A.D.), the son and successor of Hulagu Khan and Sultan Ahmad Tekudar (1282-1284 A.D.) the successor of Abuqa Khan likewise entrusted chancellorship to Khajeh Shams Al Din Mohammad Juvayni and appointed his brother Ata-Malik Juvayni as the ruler of Baghdad. At the outset of his reign, Ghāzān Khan (1295-1304 A.D.) appointed Sadr Al-Din Zanjani as chancellor and after his murder in 697 AH (1300 A.D.), jointly selected Saad Al-Din Mohammad Savoji with Khajeh Rashid Al-Din Fazlollh Hamadani as the chancellor. After Saad Al-Din Mohammad Savoji’s murder, Sultan Mohammad Uljaito put Khajeh Tajeddin Alishah Gilani in the joint chancellorship position with Rashid Al-Din (Ibid, 380-420).

Notwithstanding the massive devastation caused by Mongols, the presence and influence of a number of wise and sophisticated Muslim scholars from the east side of the Islamic world in the Mongol and Ilkhanid government systems partially compensated for the damage inflicted upon the knowledge ecosystem and ‘science’ institution of the Islamic world. Preventing the destruction of many scientific centers including two renowned schools of ‘Nizamiyeh’ and ‘Mostanseriyyeh’ upon the fall of Baghdad in 656 AH (1260 A.D.) breathed new life into the lifeless body of knowledge-seekers and reinvigorated the quest for knowledge and progress.

Likewise, Khajeh Nasir Al Din Toosi, chancellor of Hulagu Khan, invited many of the Eastern Islam scholars who had fled the swords and taken refuge in remote areas of the west to return home. He set up an observatory in the city of Maragheh, the seat of Ilkhanid government, and published a book called Zij-e-Il-Khani, which contained several tables and novel points in arithmetic and was extensively utilized by cosmologists at the age of European Scientific Movement. Khajeh used some of the Islamic astronomers and a Chinese scientist in the arrangement of Zij Ilkhanid Maragheh. Maragheh University, which was one of the largest science centers after Jundishapur and the renowned schools of ‘Nizamiyeh’ and ‘Mostanseriyyeh’, was founded by this scholarly chancellor (i.e., Khajeh Nasir Al Din Toosi). Most of the sciences and professions were taught at the university and the students would receive regular scholarship stipends (Ghanimah 1985, 18-20).

Economic Context

An economic element that besides the caliphs’ advocacy turned out to be in support of ‘science’ promotion was the Waqf institution (endowment). The Waqf per se originates from Islamic Sharia and the economic management of the Rabe Rashidi systematically collected endowments in Rabe Rashidi site. The endowments included more than seven hundred land plots, wholly-owned or partly-owned, and villages and aqueducts only
in Yazd and outskirts. In addition, several endowed properties were located in Tabriz, Maragheh, Shiraz, Isfahan, Mosul as well as in two large villages named Rashidabad and Fathabad, which are both mentioned in the endowment deed. As shown in the table below (Rashid Al-Din 1972, 131-150), the expenses related to the students and the employees were funded by the financial sources of Rabe Rashidi as an endowed institution:

Table 1 _ Annual Salaries of Teachers and others

<table>
<thead>
<tr>
<th>Practitioners</th>
<th>Salaries per year (dinars)</th>
<th>Daily ration (wheat bread: in kilogram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exegesis and Hadith instructor</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Seminary students of Exegesis and Hadith Science</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Teachers of other sciences</td>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>Assistant teachers</td>
<td>200</td>
<td>18</td>
</tr>
<tr>
<td>The ten jurists</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Coordinator of jurists, teachers and assistant teachers</td>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>Bookkeeper of library</td>
<td>50</td>
<td>9</td>
</tr>
<tr>
<td>Book dealer</td>
<td>120</td>
<td>9</td>
</tr>
<tr>
<td>Physician</td>
<td>150 for medical exam and 180</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>for medical teaching</td>
<td></td>
</tr>
<tr>
<td>Para-physician</td>
<td>150</td>
<td>12</td>
</tr>
<tr>
<td>Students</td>
<td>60</td>
<td>18</td>
</tr>
<tr>
<td>Kohl-makeup dresser (Oculist)</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>Surgeon</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>drug-holder (Pharmacist)</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>Treasurer</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Servant</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td>Sweeper</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Chef</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Water provider</td>
<td>50</td>
<td>6</td>
</tr>
<tr>
<td>Janitor</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Book holder</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Weaver</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Teacher of orphans (10 orphans)</td>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>The Ten orphans</td>
<td>Each one 10 dinars</td>
<td>3kg for each one</td>
</tr>
</tbody>
</table>

Social context

Social values in Islamic civilization, originating from the Islamic text and being institutionalized by the Islamic government in society, were prevalent throughout Islamic civilization. These values initiated transformations in society through changing human’s attitude toward the existence, nature and human’s very position in the universe. The social context underwent change in a way that ethnic and geographical boundaries were removed, and the pre-Islamic non-influential class-conscious and social stratification system was replaced with religious equality and fraternity, in which the yardstick of ‘segregation’ was only piety. Boasting about tribe and race, lineage and gender was introduced as a custom of Age of Ignorance. Absence of geographical boundaries along with a common language and sense of a united community (Quran, 21:92) created a network for scientific communications and facilitated cultural exchanges.

The sense of cosmopolitanism among the Muslim scholars led them to consider all Islamic lands as their
homeland and, as they did not see it fit to stay in an area or wanted to have access to a particular teacher or school, they would easily move to another location in the Islamic territory and considered giving services to any area as serving to the entire Islamic land. In his book of "Islamic Civilization in 4th Hegira century" (10th A.D.), Adam Metz writes:

*A Muslim could travel under aegis of Islamic flag throughout Muslim world and see his/ her fellow worshipers worshipping the same God and performing prayers identically and sharing the same religion, traditions and rituals. According to a practical rule, every Muslim had the right to citizenship so that no one could violate his/her personal freedom or subject him/her to enslavement throughout the Islamic territory (Golshani 2014, 67).*

The rule of the spirit of tolerance and the presence of broad-mindedness, and fair treatment of the other sects in Islamic communities led to the opening of verbal debates all over the realm of Islam between various circles and schools of thought as well as collaborating in the direction of advancement of sciences and techniques. George Zeydan states that:

*One of the factors contributing to the accelerated progress of civilization and the ascendancy of science and literature in the Abbasid movement was that the caliphs did not spare any effort to translate and transfer other sciences to Muslim world and appreciated scientists and translators regardless of their nation, religion and race. For this reason, the Christian, Jewish, Zoroastrian, Sabean, and Samaritan scholars gathered in the court of caliphs and the caliphs treated them in such a kindly manner that their behavior well deserves to be a model of freedom seeking and justice administration for the rulers of any nation and religion (Zeydan 1973, 58).*

Drawing upon a well-planned and calculated program, Khwaja Rashid al-Din was on the one hand constantly cognizant to collect outstanding brains and elites in *Rabe Rashidi* University, and on the other hand, he was determined to make the most of their use for the community. In the Alley of the Scholars alone, there were four hundred clerics, muftis and religious practitioners as residents, receiving good stipends and perks. In the Neighborhood of Students which was adjacent to the Alley of the Scholars, a thousand of talented scholars from all over the Islamic world would receive scholarship grants based on their merits and talents (Nasr 1971, 109).

In order to assist the scientists and contribute to the promotion and progress of knowledge, not only did he put the latest information and books as well as necessary instruments at disposal of scholars inside the university, in a letter to his son– Amir Ali, the ruler of Baghdad– he instructed his son to pay regular stipends and give rewards to scientists throughout the realm of Islamic civilization from Amu Darya to Yamuna River and from the west to areas in Asia Minor and the border of Egypt. In another letter, he ordered one of his officers in Asia Minor to grant bonuses and gifts to the scholars of Maghreb (Morocco) or Islamic Arabian Territories and mentioned the names of some scientists, six of whom residing in Cordoba and other parts of Andalusia and four scholars residing in Tunisia, Tripoli and Kairouan (Ibid, 118).

**Knowledge-oriented values**

The values that existed to support knowledge in Islamic civilization were institutionalized by the teaching of religious-educational institutions in society. The mosques were disseminating Islamic education to the Islamic community at large. These values encompassed a level of religious knowledge whose acquisition was obligatory for everyone and any other type of knowledge and from whatever source was based on that level of religious knowledge. From this place, one could learn Islamic values and the norms of how one should deal with one another and with his/her own position in the universe and his/her duty as a Muslim. George Sarton in his Introduction to the History of Science says: "I ask it again: How can one come to a true understanding of Muslims' knowledge if we do not understand its focus on the Qur' an?" (Sarton 1947, 30).

These values include:

1. Encouragement by the Qur’an and Sunnah to acquire knowledge: "*Say: Are those who know and those who do not know alike? Only the men of understanding are mindful*" (Quran, 39:9).
2. Encouragement by the Quran to explore nature:

"Will they not then consider the camels, how they are created? And the heaven, how it is reared aloft, and the mountains, how they are firmly fixed, and the earth, how it is made a vast expanse? " (Quran, 88:17-20).

3. Encouragement to acquire knowledge from whatever source:

"Those who listen to the word, then follow the best of it; those are they whom Allah has guided, and those it is who are the men of understanding" (Quran, 39:18).

4. Encouraging scientists and providing research and training facilities:
   a) Commemoration of scientists
   b) Financial aid to scientists
   c) Financial aid to students
   d) Establishing schools
   e) Abundance of libraries
   f) Endowment allocation to promote science

5. Commitment to follow the reason:

"And follow not that of which you have not the knowledge; surely the hearing and the sight and the heart, all of these, shall be questioned about that" (Quran, 17:36).

6. The truth-seeking characteristic of scholars

Abu Yakub Kendy (801-873 AD) states that " It is desirable that our aim be to acquire the right from whatever source we find, for the right- seeker deserves nothing more than the right" (Golshani 2014, 100-118).

The interwoven structure of society and political institution with Islamic values is such that the tradition (Hadith) of Holy Prophet (PBUH) becomes a source of value-driven inspiration for Rashid Al-Din in the construction of Rabe Rashidi University (Sahih Al-Moslen, 4310). Emphasizing on human actions in the world, this hadith also shows a path for non-termination and continuity of righteous actions into the life after death and identifies three aspects for it: Aspect 1: the current alms-giving whose manifestation, according to Rashid al-Din, is endowment. Aspect 2: the knowledge which is beneficial to others. What is worthwhile to consider is how the economic institution of Waqf (endowment) - a subsidiary of alms and inspired by benevolence and goodness- serves the institution of science to get it flourished to benefit all. Aspect 3: is about the righteous offspring who is the natural product of the scientific institution that has trained him/her (Rashid Al-Din 1972, 4).

Educational Management

Rashid al-Din Fazlallah was a competent and knowledgeable director in the combination and efficacious conversion of the 'raw materials' into Rabe Rashidi educational enterprise. Transforming the informal and dispersed endowments into a formal academic organization and putting it at the disposal of educational departments and the pertinent stake-holders at Rabe Rashidi was an enormous task. Formation of a conducive scholarly environment and the official determination of the organizational goals contributed to the institutionalization of the religious cause of "enduring good deeds" within the framework of an official organization (i.e., Rabe Rashidi ). Organizing the space and time of the training groups, planning for the methods and quality of teaching, administering classes, developing curricula and assigning the students into cohorts according to their talents and interests were some of the managerial skills of Khaje Rashid. He asserted that:

We also determined how many students and from which instructor to acquire knowledge and observed that the mind of each student was prone to acquire which science, including narrative and rational premises and
principles, and commanded them to read the knowledge and told them the group of students who resided in Rabe Rashidi complex and Tabriz city should come and go to our schools along with our children (Rashid Al-Din 1945, 178).

Forming family hierarchies (custodian, inspector and observer) was another significant effort taken by Rashid al-Din Fazlullah. He wrote that the custodian, in his own life, places the three most meritorious, pious and God-believing of his offspring for these three positions. He has specified difficult qualifications for appointment to these three positions which should not only be verified by the custodian, but also by the Chief Justice (head of judges) of Tabriz. In book of Waqfnameh (endowment deed), he has set out the procedure of administration for Rabe Rashidi administration after himself:

I assigned custodianship of the charity districts and related endowments to the highly esteemed and respected son, namely Jalal (May God protect him), and position of inspection to the highly esteemed and respected son, i.e. Mohammad (May God protect him), and also delegated the position of observer that was similar to the deputy custodian to the highly esteemed and respected son, i.e. Ahmad (May God give him a long life)–by religious delegation– and after them, these tasks would be assigned to a son who would be more deserving. At that time, these positions will be assigned to these five sons, i.e. Ibrahim, Majd, abdul Latif, Mahmud, Shahab and the subsequent sons after them. The condition for this position is that these officials should be competent and tectotal and this qualification must be substantiated before the ruling religious authority (Rashid Al-Din 1972, 119).

Rashid al-Din considers the reason for having the familial hierarchy in Rabe Rashidi organization as follows: by virtue of this Hadith: (As a human dies, all of his/her actions are terminated, except current alms-giving, or helpful knowledge of human and or righteous offspring who may pray for him/her), the righteous offspring would pray well for his/her father, which could make the good deeds of the father enduring and sustaining in the world after the father has deceased (Ibid, 119).

Compatibility of Rabe Rashidi with the educational system of Islamic civilization

In addition to the then social context of the formation of Rabe Rashidi that resembled the pattern of other educational organizations in Islamic civilization, Rabe Rashidi’s system was consistent with them in terms of framework and structure as well. The major difference between Rabe Rashidi and other similar scientific institutions was related to its incomprehensiveness and inattention to astronomy. It encompassed a combination of mosques, schools, hospitals, and libraries.

School of Medicine

Rashidi Dar Al-Shifa (House of Cure) or Hospital was one of the faculties for practical or clinical medicine, because besides the treatment of patients there, Khajeh Rashid introduced it as a faculty of medicine as well:

It is conditioned that a skillful physician should be present in Dar Al-Shifa and display perfect affection round-the-clock with his residence beside the hospital at the right side that is well-known as ‘house of physician’. And that physician should be able to teach medical lessons and two students should learn in the hall of hospital near the door at south side and that gate is well-known as gate of servicing personnel (Rashid Al-Din 1972, 145). And those two students have to be smart and interested in acquisition of medical science and truthful and faithful. Their housing should be placed in the lower chambers behind the area around pharmacy and they should have a constant presence for 5 years. And the aforesaid physicians should treat all the staff in Rabe Rashidi area or travelers or laborers of there if fallen ill and he should give them syrup and drug and soup. He should not be preoccupied with the treatment of others because we have appointed him for treatment of the staff and travelers and laborers in Rabe Rashidi (Ibid, 146).

Dar Al-Shifa (cure place) was in the form of a hospital and faculty of medicine where any physician was required to train 5 to 10 medical students in addition to treatment of patients. Doctors in Dar Al-Shifa are divided into two groups: full-time and part-time. The full-time physicians were working in various fields of medicine, acting as a general practitioner, an ophthalmologist and a few surgeons and several orthopedists. Students in Rabe Rashidi University were trained in theoretical science in the morning and practical knowledge
along with a physician in the evening. After examining the patients, the physician would write a prescription for them in a place called waiting room (Shabakeh) and would give it to the officer of pharmacy that was called Treasurer (Khazen) and to the pharmacist (drug holder) to prepare the prescribed drug. Like the hospitals in other parts of Islamic civilization, no money was received from the patients for the treatment in Rabe Rashidi. The residence of part-time physicians and their families was located in a zone called the Alley of Therapists, but full-time physicians in addition to having a working room in Rabash Rashidi University had housing for themselves and their families in the Neighborhood of ‘Salehieh’ (Ibid, 145-149).

Rashid al-Din’s interest in medicine was such that he organized great prizes for the best medical books, and even in remote regions of Islamic territory such as Maghreb (Morocco), some books were written in his name and sent to Tabriz. Even after being promoted to the chancellorship position, he did not neglect to build hospitals in secluded areas and his own writings, being mostly annotations on Avicenna’s medicine and encouraging others to write medical books and establish hospital and medical centers, were an effective factor in the revival of medical sciences in eighth Hegira century (14th AD) (Nasr 1971, 329).

School (Madrasa)

In addition to being a venue of education for the upper social strata, Rabe Rashidi School was a place of training and education to the students from underprivileged background and lower social classes as well. Rashid Al-Din considered salaries and housing for the students and teachers of the school. In Islamic civilization, several measures have been taken to create equal opportunities for education to the people from all classes of society (from the lowest to the highest level). In fact, accessibility of free education to all social classes has been one of the factors behind the flourishing of ‘silent’ talents:

In describing details about the interests of school and its people such as teachers and orphaned students and their guardians, this House of Knowledge is the biggest of all the houses in the garden and the residence of the single teachers is there (Rashid Al-Din 1972, 153).

Library

Rashid al-Din describes the Rabe Rashidi University’s library as follows:

I have collected sixty thousand volumes of books in all kinds of sciences, histories, poetry, anecdotes and the like from the countries of Iran, Turan, Egypt, Morocco, Rome, China and India, and dedicated them all to the library of Rabe Rashidi University (Rashid A-Din 1972, 214).

In Islamic libraries, the regulations of using the books were set out in the endowment letters. Likewise, the library of Rabe Rashidi University specified certain terms and conditions for the library, personnel and their salaries as follows:

The activities pertaining to the library are based on the regulations determined by the custodian of this place and books are placed there with the details at disposal of the custodian of the library. I know their quantity and quality as well as its people (Rashid Al-Din 1972, 149). Conditions of the books: The aforesaid books have been dedicated to knowledge-seeking students so that they could benefit by studying and transcribing and so forth (Ibid, 150).

Observatory

The interesting point in Rashid al-Din’s educational beliefs is that he was fundamentally opposed to astronomy, unlike Khans and Mongol Ilkhanids who attached a lot of importance to this knowledge because of their superstitious beliefs (Nasr 1970, 174). Rashid al-Din indicates that the Mongols were interested in some of the crafts and techniques of civilization, such as the construction of observatories and Alchemy science, and supported astronomers (Rashid Al-Din 1958, 734). Astronomy has been highly addressed in Islamic Civilization, and during the period of Muslim knowledge transfer to Europe, most of the translated books were related to astronomy. Elm Al-Mighat (Science of Times) or religious astronomy was associated with three distinct dimensions which required astronomical solutions: direction of Qiblah, determination of prayer times, and sighting the new crescent moon (Iqbal 2007, 87). In addition, although we witness the
emergence of Maragheh astronomical school at this period, Rashid al-Din’s non-supporting view of astronomy was reflected and implemented in Rabe Rashidi organization and, therefore, no attention was paid to the observatory and astronomy. In this respect, Rashid al-Din writes to his son Mir Ahmad, who was the ruler of Ardebil:

It was heard that the child has desired to study astronomy and for that reason I am deeply distressed. Be aware that you should not listen to the statements of astronomers, who are passing through the faulty and misleading routes and blind ways, as such they should not be thrown into the cradle of humankind and given free rein and you should not see the destiny of the cosmos bound to the determinism and providence of the moon and Mercury and should not assume luckiness of humans bound to the ascendance of Jupiter and unluckiness of them to the descendence of Saturn, and likewise should not pin hope in the idle images and designs of the calendar as they are too old-fashioned and obsolete. You should never consider rotation of the universe and positions of the moving stars as the means of luckiness and unluckiness of humans, and should strive for the removal of any love and appeal to this useless science from the mind and from the written papers similar to the removal of the excretions and should see the loss and benefit contingent upon the will and determination of The Great Creator, The Almighty (Rashid Al-Din 1945, 300).

Such a letter and perspective by Rashid al-Din was, in fact, due to the socio-contextual exigencies of the time given the Mongol Khan’s superstitious tendencies and the deviated departure of astronomy as an empirical science towards astrology at the time. The matter of the fact is that Rashid al-Din’s view was completely in line with his Islamic worldview because ‘astronomy’ became a precise and realistic science in Islamic civilization, and observatories were founded to promote it. In fact, it was Islamic Sharia (law) which separated astronomy from astrology and prophecy. In this respect, Ghazali asserts that:

Astronomy is of two types; the first relates to the systemic rotation of planets and chronology, which is not condemned, as the Holy Qur’an states: “The sun and the moon follow a reckoning” (Quran, 55:5). The second type relates to religious law and injunctions, which is the result of reasoning about the events and incidents via certain factors and means, being a device for recognizing the movement and flow of the divine tradition. In the meantime, it should be recognized that hyperbole and exaggeration in this respect is not commendable. Omar Ibn Khattab said: Learn about astronomy to the extent that it may help you with understanding the positions (locations) and times and land and sea processes and avoid more than this level (Ghazali 1998, 162).

Following Ghazali, Rashid Al-Din ignores the second type of astronomy, which was prevalent at his time. Rashid al-Din gives an example of the Mongols’ superstitious beliefs when Timur Khan reprimanded twelve rulers and ministers for bribery. He says:

The merchants and dealers were incarcerated and their families and relatives pleaded with one of the public officials for their release. By coincidence, a comet was seen in the sky at that time. He sent a message to Timur Khan that forty prisoners should be released to worship the comet and they were released (Nasr 1970, 312).

However, Rashid al-Din did not apply this view when attempting to introduce Hotan and Chinese sciences for translation. In fact, he did not question the first type of astronomical knowledge that relates to systemic rotation of planets and chronology. And from ancient times to the date, no one has ever translated any of the Hotan books and no one has composed or compiled anything pertaining to them either, except in the time of the just King-Hulago; late Khaje Nasir al-Din by the royal order asked a Hotan learned man who had come from Mongolia, being near Hotan, along with Hulago and had some knowledge on astronomy to see to their state of astronomy knowledge; some of the man’s astronomical knowledge revealed from his speech was recorded in a self-designed astronomical table (Ibid, 313).

Reception and Dissemination of Knowledge in Rabe Rashidi
After the translation of Hindi, Assyrian and Greek books into Arabic in the early Abbasid period, translation work was stopped due to the lack of new translation materials. In fact, with the exception of two of the three translations that Aboureihan Bouroni (Nasr 1970, 310) mentioned in his work, there was no translation of the works until the Mongol era. In Tanksughnameh book (description about people of Hotan), Khajeh Rashid Al-Din has discussed in detail the extensive efforts taken to translate books in Mongol era. He continued the work of translating the books of other civilizations after its cessation at time of Aaron Al-Rashid with emphasis on the books obtained from Hotan, Xinjiang and China. This was accomplished due to the communications and relationships established by Mongols. He has also tried to revive translation movement by the support from Ghazan Khan:

Concerning knowledge reception, Rashid states that:

*Fifty skilled physicians who had come from the farthest regions in India, Egypt, China, Levant [Syria] and other territories were ordered to attend our Dar Al-Shifa every day, and we missioned ten talented medical students to attend before any physician to learn from them in this favorable profession and sent oculists, surgeons and orthopedists in our hospital to a place built near Rashid Abad Garden, called "Treatment of Therapists" and settled the rest of the craftsmen and industrial practitioners brought from other lands and territories, each in an alley (Rashid Al-Din 1970, 147).*

Perhaps the most important contribution of Rashid al-Din to the sciences in general and medicine in particular is the introduction of Chinese sciences to Muslims. On his order, four volumes of books were prepared from Chinese and Mongol's medicine, the first of which being in Farsi is entitled "Ilkhan's Tanksughnameh in Hotan Sciences and Professions." The value of Tanksughnameh is not just in introducing Chinese science into Persian, although it is of great importance in terms of familiarity with the Chinese sciences of that time and the subsequent influence of Chinese and Mongolian sciences, especially in some aspects of astronomy and even medicine in Iran. Moreover, the introduction of Chinese science in Iran itself became a means of disseminating the paradigm of Chinese medicine in the West. The anatomical illustrations in Tanksughnameh which are adapted from the famous Chinese anatomy book (*Ts’un hsin hung t’u*) along with the related figures and theories had presumably influenced the new anatomical school in 14th century in Italy by Mundinus de Bologna who was familiar with Islamic sources. It is now gradually becoming clear that in addition to the influence of Islamic sciences in the West in the twelfth century through Andalusia and Sicilia, the West became familiar with subsequent developments in Islamic sciences, especially astronomy and medicine, and Khwaja Nasir’s school of thought and his followers such as Ghotbuddin Shirazi, although the process of this familiarization has yet to be clarified. However, it can be asserted that this familiarization took place through Byzantium. Owing to Rashid al-Din’s activities in gathering and communicating with Byzantine scholars in Tabriz, which in turn signifies their acquaintance with him and his works, perhaps it was through these interactions that not only Chinese sciences but also subsequent developments in Islamic sciences, particularly those in Maragheh, reached the West. Rashid Al-Din with his global vision became a means for transferring the second wave of the influence of Islamic sciences (the first wave started from Andalusia and the west side of the Islamic world) into the West and at the same time a means for spreading oriental sciences in Europe (Nasr 1970, 319-320).

**Conclusion**

It is a truism that development and flourishing of science at any time and place is subject to its own specific mechanisms. Science development is, in fact, not conditioned on having a particular land, race, or religion, but rather it is quintessentially contingent upon the specifications of social, political and economic contexts in a community. The value-driven system must also normatively justify the quest for knowledge and science. Educational management is also one of the most neglected essentials in the development of knowledge in Islamic civilization that was addressed in the present study.

Discussion about Rabe Rashidi University as an organization of science institution in Islamic civilization requires taking a systematic approach to analyzing the factors leading to its formation. This university in particular, and the history of Islamic science in general, is part of the history of Islamic civilization which
must be studied in an organic way in the entirety of Islamic civilization. The Islamic system prepared the
political, economic and social grounds for the development of science in community, where this potential was
present throughout this civilization, and from time to time, meritorious administrators in a corner of that
civilization brought it to fruition. The knowledge-oriented values as well as change in human insight towards
the universe and existence, on the basis of Qur’an were also institutionalized and pervasive in Islamic society.
Also, the Islamic worldview as a metaphysical foundation of knowledge, being the distinguishing feature of
Islamic and non-Islamic sciences, originated in the very same Qur’anic values. Thus, the factors that led to the
flourishing of knowledge in Islamic civilization were themselves emanating from the context in which Islamic
belief system and ideology was prevailing. This context firstly created a capacity for knowledge acquisition,
and secondly the institutionalization of the concept of ‘obligatory’ knowledge through the institution of the
mosque in Islamic society compelled all the received sciences to pass through their filter of mind so as to
be reframed according to their ‘obligatory knowledge’ mentality to take on specific Islamic coloration: the
outcome typically being conceived as Islamic science. Therefore, as a continuation of the post-Baghdad
translation tradition, with a focus on sciences from China and surrounding areas, Rabe Rashidi certainly
retained its Islamic character, and it should also be borne in mind that the capacity and resilience of
the Islamic community was such that despite having been militarily defeated and politically subdued, the
conquerors culturally gave in and were entirely assimilated into the religion and civilization of the conquered.
From an organizational perspective, Rabe Rashidi organization with its mosque, library, Dar Al-Shifa, school,
manner of administration was an epitome of the educational system in Islamic civilization.

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