The Nature of Western and Islamic Civilizations:
Formation, Evolution and Clashes

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Abstract

Samuel Huntington suggests that globalization will bring an era of 'Clash of Civilizations' in his article (1993) and the related book (1998). However, as rightly observed in Dieter Senghaas (1998), Huntington (1993 & 1998) provides no systematic theory to explain the actual behavior of core representatives and the formation of the civilizations. Therefore, the predictions about the potential clashes of civilizations and suggesting any new order of world policy and solutions are lack of theoretical supports. In this paper, I respond to the challenges by analyzing the factors responsible for the formation and evolution of the Western and Islamic civilizations. Based on related knowledge, we can resolve potential clashes of civilizations and suggest desirable infrastructures and basic collective values and practices for humankind societies that can enhance the well-being of all communities.

A.   Introduction

Samuel Huntington suggests that globalization will bring an era of 'Clash of Civilizations' in his article (1993) and the related book (1998). The works have drawn extensive attention. He suggests that there are five major cultural areas: the Sinic, Japanese, Hinduistic, Islamic and Western civilizations. And the essence of Western civilization has the following characteristics: the classical inheritance of Greek rationalism and Roman law, Catholicism and Protestantism, the rule of law, social pluralism, representative public bodies and individualism etc.. However, Islamic civilization is almost left out although he emphasizes that Muslim societies and states located at the civilization fault lines of the world which have exemplified violent clash of civilizations. As rightly observed in Dieter Senghaas (1998), Huntington (1993 & 1998) provides no systematic theory to explain the actual behavior of core representatives and the formation of the civilizations. Without establishing the mechanism on the formation of civilizations and the associated core collective beliefs and practices, making predictions about potential clashes of civilizations and suggesting any new order of world policy and solutions are lack of theoretical supports.

In this paper, responding to the challenges posted by Dieter Senghaas (1998), we analyze the factors responsible for the formation of the Western and Islamic civilizations. They have a long history of violent 'clash of civilizations' and the clashes appear to have resumed in recent decades. We define civilization and culture as the core collective beliefs, values and practices that characterized a group of nations/communities/peoples.[1] The proliferation of the adherers/people of a civilization is called geno-expansion that includes defense and proliferation. The strategies for enhancing geno-expansion are called geno-strategies. Following similar reasoning in Mo (1995, 2007, 2015), the characteristics embodied in civilizations are considered to be molded by the natural and socio-political environments that structured behavioral motivations facing related agents in the distant past. The present characteristics of their civilization are therefore the outcome of the choices under specific environment during their historical evolution. We will outline the key characteristics and related events of their historical past, compare the similarities and differences between the two

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[1] For the discussions on definitions of 'civilization' and related issues, please refer to Bosworth (2003) and Targowski (2004).

civilizations, and then formulate a theory to explain their similarities, differences and the factors driving their evolutions over time.

After we understand the mechanism responsible for the formation of civilizations, we can identify the causes of 'clash of civilizations' and suggest related policies to prevent potential clashes. Moreover, when we understand that civilizations are historical and geographic-specific, we will be more open to different values and practices, empathetic to various 'humanitarian vices' and helpful in enhancing diverse civilizations to follow their desirable courses of evolution. Based on related knowledge, we can also set up desirable infrastructures for promoting the core collective beliefs, values and practices that can facilitate international stability, economic development and raise the well-being of all humankind societies.

In the next section, I will look into the effects of environment on the formation of the ancient civilizations around the Mediterranean Sea and the Middle East. Section C sketches the key events during the evolution process of the Western and Islamic civilizations, and then explains the cause of their differences as well as the evolution of the Western civilization over time. It is followed by the discussions about the impacts of the '3-inventions' on the development of the civilizations and the resulting reverse migration of the Western Civilization from the Roman Christianity towards modern Protestant Christianity. The final section concludes our findings with related discussions.

B. Warfare and Survival: The Mother of Collective Beliefs and Practices

The one thing more important than opulence is defense. [Adam Smith, cited in Van Creveld (1989, 1991)]

All existing civilizations have to compete successfully with their peers for the means of survival during the process of evolution in their specific environment. As noted in Van Creveld (1989, 1991): 'war is permeated by technology to the point that every single element is either governed by or at least linked to it….indeed, technologies not ordinarily regarded as military, such as roads, vehicles, communications, and timekeepers, have done as much as weapons and weapons systems to shape the face of war….That infrastructure goes a long way to dictate the character of organization, logistics, intelligence, strategy, even the concept of battle itself. Without it the conduct of armed conflict would be impossible.' (p. 311) In this paper, similar to the reasoning exposed in Mo (2015) on the choice of writing systems, I demonstrate that the

key characteristics, differences and evolution of the Western and Islamic civilizations can largely be understood as their important strategy to strengthen warfare power during their competition for survival. Their current collective beliefs and practices are largely the inheritance of the survival strategies molded by the environments experienced by their ancient ancestors. We will look into how the Mediterranean Sea environment, the cradle of the Western civilizations, has molded the Classic Greek-Roman 'Medi-sea Civilization'; and how the civilization evolved when the environment facing the adherers changes over time. The Western civilization is contrasted with the Islamic civilization that is oriented in the oases scattered among vast dry lands and sand dunes around Middle-East, the 'medi-desert' environment.

As noted in Hitti (1937), the medi-desert environment has substantial effects on the behaviors and relation among communities of the habitants in the Middle East: 'Action and reaction between the townsfolk and the desert folk are motivated by the urgent dictates of self-interest and self-preservation. The nomad insists on extracting from his more favourably situated neighbour such resources as he himself lacks, and that either by violence – raids – or by peaceful method – exchange. He is land-pirate or broker, or both at once. The desert, where the Bedouin plays the part of the pirate, shares certain common characteristics with the sea.' (p. 23) Similarly, in the ancient Mediterranean Sea environment, the habitants in the coastal towns and city-states around the sea, the action and reaction among states and communities were also dictated by the urgent needs of self-interest and self-preservation. Both environments imposed that having control on trading opportunity between states and communities was essential for subsistence and affluence. Controlling essential trade routes and related sites was therefore the key geno-strategy of all states.[2] Since strategic sites were limited, the zero-sum competition for favorable sites among the communities resulted in unceasing battles in the medi-sea as well as in the medi-desert environments. As elaborated in Mo (2015), the choice of the Chinese writing system and the resulting civilization can be understood as the result of geno-strategy for uniting farming communities in the central and south parts of China to fight against the nomads from their West and North. I will demonstrate that the collective beliefs and practices in the Western

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[2] The geno-strategy in the medi-sea environment can be summarized by this statement: 'Whosoever commands the sea, commands the trade of the world; whosoever commands that trade of the world, commands the riches of the world and consequently the world itself.' [Sir Walter Raleigh. Cited in Rodgers (1937, 1964)].

and Islamic civilizations can also be comprehended as the geno-strategies chosen under the medi-sea and medi-desert environments respectively. That is, the characteristics of the civilizations are largely their survival traits during their long evolution process in their specific environments. And in the long-run, with increasing level of recognition among adherers and the diminished power of vested interests over time, civilizations did and will evolve according to changes in their environment. [3] Table 1 summarizes the environments facing the states/communities located in the Mediterranean Sea and Middle East, the targets and dominant types of battle, as well as the key determinants of winning battles.

Table 1:
Environment and Warfare: Ancient Mediterranean Sea and Middle East [#]

	Medi-sea	Medi-desert
Environment	Coastlands distributed around the Sea.	Oases distributed among dry lands and sand dunes
Target	Controlling the trade routes and sites linking the coastlands around the Medi. Sea, Black Sea and Levant.	Controlling key trade routes and sites between the Far East, Middle East and the West that includes Levant and the gateways to the Silk Road, Persian Gulf and Red Sea.
Types of Dominant Battles	Sea battles	Land battles
Key determinants for winning the battles	Direct inputs: Quantity and/or quality of ships; quality of seamen, warriors and weapons for sea battles.	Direct inputs: Quantity and/or quality of warriors, animal power and weapons for land battles.
	Infrastructures: Speedy mobility of supplies, ships and warriors; quality and/or quality of ships and skillful loyal sailors; controlling strategic coastlands and ports for supplies.	Infrastructures: Speedy mobility of supplies, warriors and animals; quantity and quality of animals like camels, horses and sheep; controlling strategic sites and land for supplies.
Endowment and knowledge/technology requirements for geno-expansion	i) superior and loyal warriors; ii) superior quality and/or quantity of ships/fleets that depends on related technology, woods, skillful seamen and technicians; iii) superior knowledge about seafaring; iv) controlling superior strategic coastlands, ports and land for essential supplies.	i) superior and loyal warriors; ii) superior quality and/or quantity of animals including: camels, horses, sheep; iii) superior knowledge about the desert environment and landscape; iv) superior knowledge about livestock raising/breeding; v) controlling superior strategic sites and land for essential supplies.

Key references: i. Van Creveld (1989, 1991); ii. Rodgers (1937, 1964).

Religious beliefs and practices are the most distinctive factor that characterizes different civilizations. As reviewed and suggested in Sosis & Alcorta (2003), it is commonly

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[3] Mo (1995, 2004, 2007) demonstrate how the vested interests can create rigidities and slow down the optimal adjustments for development and growth during the process of evolution in Chinese history.

observed that the indoctrination process of religious beliefs entails significant costs, such as time, energy, and material, as well as physical and psychological pain, which appear to be greater than any derived benefits. Consequently, religious practices are difficult to be explained by rational and egoistic-based models. The costly religious rituals associated with Islam are the obvious example. The followers are mandatory to pray at five specific times during the day and night, to fast during the ninth month of the lunar calendar or substitute by feeding the poor for missing fasting day, to pay money that exceeds their minimum needs for charity annually, to follow the Islamic rules in daily life that include the operation of business activities and not to consume pork. Many of the costly practices obviously crowd-out valuable resources that can be productively used for other activities to enhance the survival fitness of the community and/or adherers. The substantial costs have to be balanced by comparable geno-benefit to the community. Among other possible benefits, social solidarity theories suggest that the major benefit of the religious indoctrination is promoting group solidarity by a unified system of beliefs and practices related to sacred ideas and objects that unite diverse community members into one single moral community. The sense of being a collective member evokes shared responses, either conscious and voluntary or unconscious and autonomic, among adherers. It is commonly observed that religious beliefs related to sacred things can incorporate powerful emotional senses and practices that are frequently counterintuitive while impervious to time and logical thinking. The recurrent components of ritual like exaggerated formality and repetition as observed in Islam, can be considered as the tools for facilitating collective sense of being a whole body among members by eliciting arousal, directing attention and enhancing memory. This function of religions find supports from the 'social dilemma' literatures which suggest that all social species face various 'collective action problems' such that self-interest maximizing of individuals in a community does not produce the best collective outcome in many cases (among many others, Olson, 1965; Smith, 2010) Costly religious indoctrination can therefore reduce social dilemma problems in a community and therefore enhancing common goods of the members by creating and maintaining intragroup solidarity and perpetuating social order. It turns out that the intensity of religious indoctrination effecting on the level of collectivity among the members, has different effects on the strength of war-power on the medi-sea and medi-desert nations and therefore, their survival fitness.[4] In the following

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[4]This instrumentalization of religions for political purposes is commonly observed. For instance, as asserted in

section, I will look into the role of collective beliefs and practices, particularly religion, in determining the war-power of the nations in the different environments.

Let λ be the index for the sense of collectivity among related members and r be the intensity of religious indoctrination. r can raise λ such that:

$$\lambda(r) \text{ , with } \lambda' > 0, \lambda'' < 0; \tag{E1}$$

Since religious beliefs and rituals are meant to be followed without factual supports and questions on their truths, religious indoctrination thus makes the followers to act repeatedly without evidences and used to believing in counterfactual statements and counterintuitive thinking. In the process, the capability of rational and logical thinking of the adherers is diminished over time. Therefore, the indoctrination process not only creates physical and psychological costs as stated in Sosis & Alcorta (2003), it also reduces the capability of the adherers to conduct rational, logical adjustments to changes and to learn new knowledge.[5] Defining q to be the level of rationalism that is correlated with the levels of logical reasoning, knowledge and technology in a community, r thus has negative effect on q such that:

$$q(r) \text{ , with } q' < 0 \text{ , } q'' > 0; \tag{E2}$$

Firestone (1999): 'Underlying such questions is the indisputable fact that divinely justified war became an item of major importance in the earliest Islamic period, and that the concept of holy war quickly became a powerful motivator that has had an extremely important impact on the extent of Islamic empires and spheres of influence, on personal religious behavior, political and religious policy, international economics and law, and the self-perception of individual Muslims and the universal Muslim community as a whole.' (pp. 5-6). 'A good starting point to explore the relationship between religion and politics in the lands of Islam and to illustrate the point that religion is easily manipulated by all political actors is the history of the first centuries of Islamic rule.' (Plateau, 2008) Another example on the religio-political interactions in the Western civilization can be found in Guillorel (1981): '"One faith, one law, one king': such was the slogan introduced by the ideologists of the French monarchy at the beginning of the 16th century. The same ideological notion is found in the same period in other countries where modern states were developing….to the Catholics, their faith was the ground-pillar of the Kingdom, and the king of France was 'the Church's eldest son.'" There is no wonder that Black (2008) concludes that: 'We find that the idea of holy 'war'– going to war on religious grounds, either to defend one's faith or to disseminate it – far from being peculiar to Islam, was more or less invented by the late Roman empire, and adopted by the new nation-kingdoms of Europe.' (p. 5) and, 'up to c.1050 Christian Europe, Islam, and the Byzantine world had more in common than is usually thought.' (p. 1) Religions were commonly used as the key tool for nation-building in the regions and therefore sharing many similarities in related aspects.

[5] For some possible mechanism and effects, see Kuran (1996, 2004). It is not surprising that under the intensive Islamic religious indoctrination, finally: '…both philosophy and the appeal to reason as an independent guide died out in the Muslim world …' as concluded in Black (2008, p. 6).

In sea battles, warriors (F) cannot fight without a ship (S) and vice versa. F and S are therefore highly complementary such that they have the Kremer (1993) 'O-ring' relationship. The power of a division (D_S) in sea-power equals:

$$D_S = SF \text{ , with S and F measured in efficiency units;} \tag{E3}$$

The D_S function has the characteristic that when either S or F is zero, D_S equals to zero. Moreover, the marginal product of each input equals to the level of the other. This implies the positive assortative matching phenomena: high quality ships tend to match with high quality fighters and vice versa. (Kremer, 1993) The multiplicative relationship and the strong interdependence among inputs foster strong sense of elitism and competitions among stakeholders: each division head will require the best quality of all related inputs available, while the stakeholders of each input demand strongly on the quality of the partner inputs.[6]

The technology in sea warfare has experienced unceasing advances in carrying capacity and speed by improvements in mechanism to harvest the power of wind, methods of maneuver, building materials and construction techniques. Moreover, sea warfare also experienced unceasing changes in combining different types of vessels in transportation and battles and improvements in war engines such as ballistae and catapults. In comparing to the land warfare in the medi-desert environment which largely relied on man and animal powers, the technology requirement of sea warfare is much more sophisticated.[7] The efficient units of ships therefore depend on W and qM. They are respectively wood (W) and the quality (q) of manpower (M) available to the state such that:[8]

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[6] Competitions in sea warfare fostered elitism, rationalism, efficiency and ship-building industry in the state level also. In the chapter discussing about the Greco-Persian Wars, Rodgers (1937, 1964) recorded: '… the man whose statesmanship and military and naval skill were to save Greece became prominent in Athenian affairs.' 'it was urged that the silver revenues should be divided among the citizens as a bonus; but Themistocles proposed and carried a decree that this income should be devoted to building 200 trieres, for he saw that Greece must take heed of the development of the Persian navy.' (p. 54)

[7] Please refer to Van Creveld (1989, 1991) for details. Also, ship-building is one of the largest technological undertakings created by men, 'since waterborne vessels do not have to drag their own weight along in the same way that land vehicles do. Type for type, ships in general, and warships in particular, have always been bigger than their land-bound equivalents, often representing by far the largest and most complicated movable machines produced by, and at the disposal of, a given society at a given time and place.' (p. 52)

[8] Van Creveld (1989, 1991): 'Trees of the size and quality needed to build the largest and most powerful naval craft are by no means easily found, a fact that has always played a role in determining which societies could, or

$$S = S(qM, W) \text{ ; with W indicate the efficiency units of wood;} \qquad (E4)$$

Since the number of fighters in sea battles is limited by S, such that: $F = F(S)$. The competition among the states in the medi-sea environment is the competition of national power (P_N) that is predominantly determined by sea/naval power (P_S) such that $P_N = P_S$. For simplicity, assume D_S is identical, P_S equals to the summation of the n identical D_S and the level of collectivity (λ) such that:[9]

$$P_N = P_S = (D_S + D_S + \ldots)^\lambda = [n\, S(qM, W)F(S)]^\lambda \text{ ; with } 0 < \lambda < \infty \text{ and,}$$

$$S_{qM} > 0,\ S^2{}_{qM} < 0;\ S_W > 0,\ S^2{}_W < 0;\ F_S > 0,\ F^2{}_S < 0. \qquad (E5)$$

In the medi-sea environment, the strength of P_S largely determines the survival fitness of the states, their key geno-strategy is therefore maximizing P_S by balancing the marginal cost and benefit of r on P_N.[10]

On the other hand, as concluded in Van Creveld (1989, 1991: p. 81), during the age of tools, the predominant source of energy employed in field battles consisted of human and animal muscle. Before 1500 A.D., almost all weapons like sword, spear, bow and shields, were simple and hand-held, number of fighters largely determines the total physical strength of army in battle fields. Additionally, in the medi-desert environment, individual mobility is highly restricted. Sedentary farmers are tightly tied to the limited land in scarce oases among sand dunes and dry lands. Controlling key land sites endowed with the sources of water supply, fodder, manpower (M), and animals (A) like camels, horses, oxen, mules and donkeys that are

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could not, develop into active seafarers and naval powers.' (p. 53) 'Early Arab fleets were able to dominate the eastern Mediterranean. However, after the beginning of the eleventh century, the Byzantine reconquest of Crete and Cyprus seems to have confronted them with great difficulties in obtaining wood which, from now on, had to be imported from as far as the forests of northern India. Consequently, the Arabs were unable to maintain the quality of their ships. They began to lag behind the Italian city-states, …, none of whom suffered from the same handicap.' (pp. 60-61)

[9] $0 < \lambda < \infty$ captures the level of collectivity among the members related to P_S. In the worse case, the members suffer from damaging social dilemma problems with $\lambda = 0$ and $P_S = 1$, regardless the levels of other factors.

[10] Apart from religion, the other common tools for raising the sense of collectivity include language (Smith, 2010; Cemiloglu, 2009), logographic writing system (Mo, 2015) and, kinship, education and reciprocal legal system. (Axelrod, 1984)

essential for power, food and travelling in the medi-desert environment is essential for the success among competing trading and warrior camps. The animals are essential for moving rapidly at a considerable distance from one oasis to another and providing food during campaigns. This O-ring relationship between animals and fighters (F) in medi-desert battle fields suggest that the total physical power to destroy in a division of land army (D_L) equals to AF, with F largely depends on M while A also depends on the extent of grasslands (G) available, such that:

$$D_L = AF \; ; \text{with } A = A(G, M) \text{ and, } F = F(M); \tag{E6}$$

Besides the 'hardware', the strength of a camp also depends on the shared norms, beliefs and practices among group members that raise their sense of collectivity. Assume there are n identical divisions. NP depends on the summation of D_L and the level of collectivity among members, such that:

$$P_N = P_L = [n \, A \, (G, M)F(M)]^{\lambda} \; ;$$

$$\text{with } A_G > 0, \, A^2{}_G < 0 \; ; A_M > 0, \, A^2{}_M < 0; \, F_M > 0, \, F^2{}_M < 0; \tag{E7}$$

Since G and M depends on the success of conquests which in turn determined by the P_N, the geno-success of the states in the medi-desert environment thus largely depends on the sheer mass strategy, that is, the scale of loyal manpower and animal power that can be mobilized for warfare.

Besides the scale of man and animal powers, a key determinant of P_L is their mobility. As discussed in Van Creveld (1989, 1991) about field battles: 'source of energy employed in technology was man himself. Muscle was applied to material in order to do work, which is why we can speak of the Age of Tools.' (p. 11) 'The essential unity of the period under consideration is also the result of the equality of maximum energy that could be utilized by all peoples. So long as the range of weapons is limited, everything pertaining to field warfare must necessarily be mobile.' (p. 22) This P_N concern provides a possible reason for the religious restrictions on the consumption of pork that is a tradition in the Ancient Near East

cultures including Syria and Phoenicia.[11] Besides other possible explanations, one reason is that unlike other commonly herded animals raised in the region like camel, horse, sheep and cow, pigs are not herdable and therefore are not mobile for long distance. The religious restriction on pork consumption can be comprehended as a means of eliminating pig-farming among communities in order to maximize their mobility for warfare.[12]

Since religious belief is to guide action instead of reasoning and finding truth, decisions and actions of adherers can be made quickly without evidence. Indoctrinated monotheistic belief thus gives speed and economy for mobilizing manpower and resources for winning field battles in the medi-desert environment. As the technology requirements of the weapons and transportation for P_L are primitive in the medi-desert environment, the decline of rationalism, knowledge and technology caused by raising r has no substantial negative effect on P_L and therefore, the survival fitness of related communities/nations.[13] That is, unlike under the medi-sea environment, the marginal benefit of r is substantial while the marginal cost of r is minimal in affecting P_N in this medi-desert environment. This may explain why the Islamic Medi-desert Civilization is characterized by the full dictation of the religious beliefs in all aspects of life in the Muslim world. The resulting stable trade partnerships and networks between the diverse ethnic states and communities in the oases of the vast deserts were essential for their prosperity and survival in the medi-desert environment.[14]

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[11] For related details, please refer to: 'Religious restrictions on the consumption of pork' in: *research.omicsgroup.org* ; access: 3 April 2016.

[12] Some supports about this explanation can be found in Braudel (1987, 1993): 'Nomadic daily life followed the vanishing grass…. nomadic habits were weakened by contact with settled peasants. As well as camels, sheep were bred; and their travelling range was very limited. Once the Bedouin became sheep-farmers, they were no more than chaouya or shepherds – only one step above the despised lowest category, the breeders of oxen or buffaloes, firmly tied to one place….. These aristocratic tribes were continually at war: the stronger drove out the weak.' (p. 52)

[13] About field battles, Van Creveld (1989, 1991) noted: 'As in the case of ancient warfare, it is difficult to point to any important battle where victory was due solely or even principally to the clear cut effect of a superior weapon. Rather, the most successful armies were often those that combined perfectly ordinary infantry and cavalry weapons in such a way as to make the best possible use of both.' (p. 19)

[14] The complementarity between the gains from stable trading networks and military power contributed to building-up the most unified and extensive Muslim empire in the world. In addition, the sense of collectivity also facilitates voluntary provision of social services among religious members. It is commonly observed that religious communities develop charitable organizations for providing various social services to the poor. They therefore promote socio-political stability through reducing wellbeing inequality among people and other problems associated with social dilemma.

In the Islamic empire-building process, the resource was limited by the neighboring regions and the only constraint to Islamic expansion is the P_N of the empire. The sheer manpower strategy empowered with tight collective actions promotes stable trade networks that generate economic and military gains in the Muslim world. The mechanism generated a virtuous cycle of P_L, M and G under the geno-strategy had resulted in the great Islamic Empire that once extended from the Atlantic to the Himalayas, the Caucasus to the Sahara including the core medi-desert territories of Arabia, Levant, Egypt, Mesopotamia and Iran.

C.   **Formation and Evolution of the Western and Islamic Civilizations**

Table 2 summarizes the major characteristics of the civilizations evolved in the Western and Islamic regions. Based on the assumption that collective beliefs and practices of communities are geno-strategy to maximize their survival fitness, in particular, the NP of the habitants in the regions, we try to understand the characteristics of the two civilizations as the survival traits driven by their respective environments during their evolution process. The core characteristics of a civilization can be separated into social, economic, political and religious spheres. Since religions are the most spectacular, pervasive and in many cases, the distinguishing element in many civilizations, we will largely focus on religious beliefs and practices as their key geno-strategy in the medi-sea and medi-desert civilizations.[15] The Western Civilization oriented from the Classic Greek-Roman civilization. However, it evolved into, first, the Roman Catholic and Byzantium Orthodox Christianity, and later, the protestant Christianity and finally, the modern religious inclusive Western civilization. In section C2, we will explain the cause and mechanism of the evolution in the Western civilization. The key events, characteristics and related comments during the formation and evolution process of the two civilizations are listed in Table 3. Key events in the evolution process will be referred to and/or explained by related theoretical models.

Insert Table 2 about here

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[15] In the case of Muslim communities, all spheres are totally integrated under the religion.

Table 2: Characteristics of the Western and Islamic Civilizations

	Classic Greek-Roman / Medi-sea Civilization	Roman Catholic and Byzantium Christianity	Modern Protestant Christianity	Islamic / Medi-desert Civilization
Religious belief	Polytheism	Abrahamic Monotheism	Abrahamic Monotheism	Abrahamic Monotheism
Religious power	Low	Strong: authoritative Pope or churches	Low: priesthood of all believers, no central authority	**Sunni**: strict adherence to religious doctrine in Quran and practice of the Prophet; **Shia**: Religious but accept new revelation by their ayatollahs as reflections of God on earth
Political sphere	Rationalism, rule of law	Union of government and religious authority	Separation of government and religion	Governed by religious codes; full integration of government and religion
Attitudes towards war	A necessity for survival: militarism and colonization	'Jesus rejected and denounced all physical violence.... Early Christians refused military service' [R1: p. 35]	'Jesus rejected and denounced all physical violence.... Early Christians refused military service' [R1: p. 35]	'Muhammad …was a war leader … the caliph held the monopoly of the legitimate means of coercion … those refused to submit to Islam … were to be killed.' [R1: p. 35]
Social values	Rationalism, elitism, individualism	Dominated by religious authorities; Collectivism	Individualism; Priesthood of all believers	Governed by religious codes; Strong collectivism
Freedom to express	Liberal	Restricted	Liberal; religious tolerance	Governed by religious rules, restricted
Familial practice	Monogamy	Monogamy	Monogamy	Polygyny

Notes: i. R1 = Black (2008); ii. As commonly observed in related studies, although the Islam and Christianity can be largely traced to the same origin, their roles as the instruments to politics are different. While Christianity has never fully integrated with politics, Islam is totally integrated with political, social and economic spheres in the Muslim world. For instance: '…. unlike Christianity, the separation between politics and religion, God and Caesar, Church and State, spiritual and temporal authority, has never really occurred in the Islamic world. As a consequence, individual freedom, social pluralism, civil society, and representative government, were prevented from evolving in Muslim societies. The reason for the lack of separation between the religious and the political spheres in the Muslim world is argued to be historical: the Prophet Muhammad became the political leader of his own city (Medina), causing a complete merging of religion and politics and suppressing any move toward building a religious establishment. In the words of Ali Shari'ati, "the Prophet of Islam was the only one who simultaneously carried the sword of Caesar in his hand and the heart of Jesus in his chest"' (Platteau, 2008).

Insert Table 3 about here

Table 3: Evolution of the Western and Islamic Civilizations, Events and Environments

Year	Events and Observations
	The formation of the Abrahamic monotheistic religion in Levant: The Old Testament recorded the Mosses exodus from Egypt to Levant. In the process, Mosses established the monotheistic religion in order to align the activities of the people by coining their collective beliefs and practices in the name of God for maximizing the survival chance of the Jewish community. The people finally conquered Canaan in 1400 B.C. and established the first Abrahamic religion at national level. The record documented in detail about the effects of the monotheistic religion in raising the collective power of a community as a tool for nation-building in the Levant. The site lies in the junction of Fertile Crescent and Mediterranean Sea. Its strategic value for trade resulted in the unceasing competitions between the later medi-sea and medi-desert powers.
800 B.C. - 493 A.D. – 1453 A.D. The Roman Empire	Military expansion of ancient Roman Kingdom, Roman Republic, Roman Empire and the end of West Roman empire in 493 A.D.. The empire-building process was founded largely by king's power – military power complemented with reciprocal laws imposed by bureaucratic system to motivate cooperative activities among members. However, the king's power finally evolved to incorporate religious power during the Byzantine Empire which was overthrew by Ottomans with the conquest of Constantinople in 1453. {The mode of Roman governance demonstrates the elements of king's power - militarism, legalism and bureaucracy as the infrastructures of empire-building, which are also distinguishing elements in the Western civilization.}
	Greece: The origin of Western Civilization 'It has been said that the Greeks are the first ancient society with which modern western society … feels some sort of affinity. The ancient Greeks were clearly a people who warred and enslaved people. They often did not live up to their own ideals. However, their achievements in the areas of art, architecture, poetry, tragedy, science, mathematics, history, philosophy and government were of the highest order and worthy of emulation by the Romans and others. *Western thought begins with the Greeks, who first defined man as an individual with the capacity to use his reason. Rising above magic and superstition, by the end of the fifth century, the Greeks had discovered the means to give rational order to nature and to human society.*' [R1: L7] (Italics mind)
5th Century B.C. Greece	'However, the 5th century was also an age of war and conflict. Between 490 and 479 B.C., Greece was invaded by the army and naval fleet of the Persian Empire. By about 500 B.C. the Greek city states had lost their kings (with the exception of Sparta) and had embraced a new form of government through councils of citizens. Almost immediately, however, these states were confronted by an invasion of the Persian Empire.' [R1: L7]
479 B.C. Greece	'By 479 B.C., the Greek forces had all conquered the Persian army and navy. After the Persian Wars, Athens emerged as the most dominant political and economic force in the Greek world. The Athenian polis, buttressed by the strength of its Council of Five Hundred and Assembly of citizens, managed to gain control of a confederation of city-states which gradually became the Athenian Empire.' [R1: L7]
	Competition and the need for rationalism to survive. 'The political and social upheaval caused by the Persian Wars as well as continued strife between Athens and Sparta (see Lecture 7) had at least one unintended consequence. In the 5th century, a flood of new ideas poured into Athens. In general, these new ideas came as a result of an influx of Ionian thinkers into the Attic peninsula. Athens had become the intellectual and artistic center of the Greek world. Furthermore, by the mid-5th century, it had become more common for advanced thinkers to reject traditional explanations of the world of nature. As a result of the experience of a century of war, religious beliefs declined. Gods and goddesses were no longer held in the same regard as they had been a century earlier. *I suppose we could generalize and say that the Persian and Peloponnesian Wars taught that the actions of men and women determine their own destiny, and not "Moira"*' [R1: L8] (Italics mind) {Similar to the Warring states period in China as described in Mo (2005), the loosely connected and keenly

competing states along the coastlands of the Mediterranean sea that allow talents and people to move around promoted the development of rational thinking, skills, knowledge, technology and individualism. Talents and innovations were highly rewarded while suppressions were costly. The modern Western civilization is largely the heritage of the ancient Greeks which includes the beliefs in rationalism, elitism, freedom, equity, monogamy, competition and militarism.}

431-404 B.C.	The Peloponnesian Wars fought between Athens and Sparta

'The period from 500-323 B.C. is the Classical or Hellenic age of Greek civilization. The brilliance of the Classical Greek world rested on a blend of the old and the new. From the past came a profound religious belief in the just action of the gods and the attainment of virtue in the polis. Such a history helped develop a specific Greek "mind" in which the importance of the individual and a rationalistic spirit were paramount.' [R1: L7]

399 B.C. Socrates	'In 399 B.C., Socrates was charged with impiety by a jury of five hundred of his fellow citizens. His most famous student, Plato, tells us, that he was charged "as an evil-doer and curious person, searching into things under the earth and above the heavens; and making the worse appear the better cause, and teaching all this to others." He was convicted to death by a margin of six votes. Oddly enough, the jury offered Socrates the chance to pay a small fine for his impiety. He rejected it. He also rejected the pleas of Plato and other students who had a boat waiting for him at Piraeus that would take him to freedom. But Socrates refused to break the law. What kind of citizen would he be if he refused to accept the judgment of the jury? No citizen at all. He spent his last days with his friends before he drank the fatal dose of hemlock.' [R1: L8]
Plato	'PLATO (c.427-347 B.C.) came from a family of *aristoi*, served in the Peloponnesian War, and was perhaps Socrates' most famous student.' [R1:L8] He authored the *Republic that* discussed the definition of justice and different forms of public governance.
387 B.C.: Plato	'He was twenty-eight years old when Socrates was put to death. At the age of forty, Plato established a school at Athens for the education of Athenian youth. *The Academy, as it was called, remained in existence from 387 B.C. to A.D. 529, when it was closed by Justinian, the Byzantine emperor.*' [R1: L8] (Italics mind)
335 B.C.: Aristotle	'At the age of eighteen, Aristotle became the student at the Academy of Plato (who was then sixty years of age). *Aristotle also started his own school, the Lyceum in 335 B.C. It too was closed by Justinian in A.D. 529*. Aristotle was a "polymath" – he knew a great deal about nearly everything. Very little of Aristotle's writings remain extant. But his students recorded nearly everything he discussed at the Lyceum. In fact, the books to which Aristotle's name is attributed are really little more than student notebooks. This may account for the fact that Aristotle's philosophy is one of the more difficult to digest. Regardless, Aristotle lectured on astronomy, physics, logic, aesthetics, music, drama, tragedy, poetry, zoology, ethics and politics. The one field in which he did not excel was mathematics. Plato, on the other hand, was a master of geometry.' [R1: L8] (Italics mind)
146 B.C.	The Greek peninsula became under the rule of Roman.
129 B.C.	Parthians conquered Mesopotamia. The Parthian empire located in the Silk Road between the Mediterranean Basin and the Han China soon became a center of trade and commerce.
27 B.C. Expanding Christianity	Incessant political disruptions happened in the late Roman Republic that resulted in its fall in 27 B.C.. The year marked the start of Roman empire. With the preaching of Jesus and his followers, Christianity grew in the next few centuries although it was heavily persecuted throughout the Roman Empire. Christianity began spreading north and west into Europe, carried by missionaries, merchants, and soldiers from the Levant. People were attracted to the idea of social equality, justice, and the promise of an afterlife that Christianity offered.
313 A.D.	Edict of Milan by the Roman emperor. It allowed freedom of religion throughout the Roman Empire. Constantine I reorganized the empire, made Constantinople the new capital. The Latin culture was gradually replaced by the Greek culture and is characterized by Orthodox Christianity. 'the West gradually became distinct in religio-political culture and organization from the Eastern Roman empire after the transfer of the capital to Constantinople (330)' (R2: p. 2)
380 A.D.	**Instrumentalization of religious power in Western Civilization** Theodosius I made Christianity the official religion of the Roman Empire. The Christian

	persecution of paganism under Theodosius I began in 381. This marked the end of Classic Greek-Roman polytheism and the formal instrumentalization of religious power in the Western civilization.
476 A.D.	Fall of the Western Roman Empire caused by the large-scale irruptions of 'barbarians' outside Roman culture including Goths, an East Germanic people, and others. 'After the Germanic invasions of the fifth century and the collapse of imperial power in the West, its centre shifted towards the new nation-kingdoms of Visigothic Spain, the Franks, and various German tribal groupings….The Latin Catholic West, then, included western Europe, the German-speaking lands, and eventually Hungary, Poland, and Scandinavia. Between the eighth and the eighteenth centuries, one may loosely equate the West with Europe.' (R2: p. 3)
529 A.D.	**The end of Greek rationalism** *The Academy in Athens established by Plato in 387 B.C. and the Lyceum school started by Aristotle in 335 B.C. was closed in A.D. 529 by Justinian, the Byzantine emperor*. The events marked the formal ending of the Classic medi-sea Greek rationalism tradition as a result of progressive religious indoctrination in Western civilization.

During the reign of Justinian I (r. 527–565), empowered with the monotheistic religion, the Empire reached its greatest extent after reconquering much of the fallen Roman western Mediterranean coast. "We find that the idea of holy'war'– going to war on religious grounds, either to defend one's faith or to disseminate it – far from being peculiar to Islam, was more or less invented by the late Roman empire, and adopted by the new nation-kingdoms of Europe." [R2: p. 5]

Middle Ages, about 476 – 1453, in between the fall of West Roman Empire to the fall of the East Roman Empire: 'The Byzantine or East Christian cultural zone …comprised those peoples and lands of eastern and south-eastern Europe that adopted the religion and culture of Greek-speaking Constantinople, notably Bulgaria, Serbia and finally Russia. These imitated the Byzantine form of sacred monarchy.' '*Byzantinum was politically the most centralized; its emperor claimed suzerainty over the new independent nation-kingdoms of Bulgaria, Servia, and Russia.*' '*The West was united, for religious purposes only, under the papacy*.' [R2: p. 3] (Italics mind)

570 A.D.	Muhammad was born into the most powerful tribe in Mecca, the Quraish, around 570 A.D.

Invention of Islamic monotheistic religion as the nation building instrument in Arabia

'Muhammad's decisive achievements took place between about 610 or 612 and the date of his death in 632. Arabia at that time was fragmented by rival tribes and confederations, and wide open to foreign influence and to the colonizing efforts of Persia, of Christian Ethiopia, of Syria and of Byzantine Egypt. *Without Muhammad, it would never have achieved unity and, thus strengthened, …*' [R3: p. 45] (Italics mind)

'God has joined "knowledge and the pen with their task of apostolate and persuasion, to power and the sword with their task of victory and domination … religion without *sultan* (power), holy war (*jihad*) and wealth, is as bad as power, wealth and war without religion"' [R2: p. 15] 'In this way religion and government would be reunited…. It was the Mamluks who stemmed the Mongol tide and finally drove out the European crusaders.' [p. 27]

602-628	The wars between the Byzantine Empire and the Sasanian Empire of Persia. Both empires were exhausted by the wars. They became vulnerable to the sudden emergence of the Muhammad Islamic forces empowered with the fully integrated king's and religious powers conquered the entire Sasanian Empire and deprived Byzantine territories that included the Levant, Caucasus, Egypt, and North Africa in a short period.

In 651, Persia was defeated by the Arabian empire. It controlled the Levant, the Spice Route and the Silk Road in the regions.

In 680 A.D., soldiers of the second Umayyad caliph killed Ali's son, Husayn. Muslim separated into two groups: the Shias largely located in the current Iran and Iraq who look to the Imams—the blood descendants of Ali and Husayn, and the Arabic based Sunis that dominates the rest of the Muslim communities.

Battle of Talas River: July 751 A.D., Chinese prisoners captured in the aftermath of the battle brought paper-making technology to the Middle East.

Paper-making factories first established in Arab-dominated cities like Baghdad, Cairo and Delhi. The first European paper mill was established in Valencia, Spain in 1120. From these Arab-dominated cities, the

technology later spread to Italy, Germany, and across Europe. The technology, along with woodcut printing and later movable-type printing, fueled the advances in science, theology in Europe's High Middle Ages. [Source: http://asianhistory.about.com/od/centralasia/a/BattleofTalas_2.htm; access: 5 Feb. 2016]

'Paradoxical as it may seem, Islamic civilization as a whole, between 813 and 1198, was both one and many, universal and regionally diverse. …Everywhere Islam built mosques …Everywhere same techniques … Everywhere from Persia to Andalusia wandering entertainers performed …cohesion of Islam … selected those he judged best … bought books written in Persia, Syria …' (R3: p. 77)

{This recorded the integrative power, benefits and effects of the Islamic monotheistic relgion. The Islam demonstrates the strength of full integration in king's and religious powers, and the resulting successes in cultural, economic and military spheres of the Medi-desert Civilization in this historical episode.}

'up to c.1050 Christian Europe, Islam, and the Byzantine world had more in common than is usually thought.' [R2: p. 1]

{First, the East Roman Empire, and later, the Arabian Empire, discovered the role and benefits of monotheism in raising the collectivity among diverse peoples, communities and territories. Empowered with the religious tools, both empires exerted immense and long-lasting effects on the development and civilizations around the regions}

1095-1270	The Crusades. In 1095, Byzantine emperor Alexius Comnenus requested Pope Urban II in Italy for military support to stop Turks advancement in the Levant.

Mongol invasions (1202 - 1405) and the '3-inventions epoch' in the regions

Gunpowder spread to the Arabs from China in the 13th century and thence to Europe. According to English philosopher Francis Bacon writing in *Novum Organum* : 'Printing, gunpowder and the compass: These three have changed the whole face and state of things throughout the world; the first in literature, the second in warfare, the third in navigation; whence have followed innumerable changes, in so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries.' [R4]

The theory of state independence from the church progressed by stage. Thomas Aquinas (c.1225-1274), … He made a point of insisting that: 'in those things that pertain to the civil good, the secular power is to be obeyed rather than the spiritual…' [R2: p. 29]

{with the advancing of the '3-inventions epoch' and increasing competitions for the opportunities opened up by the inventions, the importance of rationalism and technology was increasing over time for maintaining national competitiveness which was associated with the decline of religious power.}

1368: The fall of Mongolian Yuan in China proper. Founding of the Ming Dynasty.

The rise of Ottomans

Ottomans were leaders of the Islam Turkish warriors. They entered Anatolia with Turkmen nomads who flee from the Mongols. They overwhelmed Byzantium and occupied eastern and central Anatolia during the 12th century. The Turkish Empire extended to Balkans between 1362 and 1389 and overthrew the Byzantine Empire with the conquest of Constantinople in 1453.

'As the eleventh century drew to a close, Europe began its reconquest of that inland sea…..closed to Islam, which found itself permanently handicapped,….from Asia it was half-submerged by long, cruel and savage Mongol invasions between 1202 and 1405…. With the return of better times and a recovery in the world economy, broadly in the sixteenth century, Islam once more profited from its intermediary position between East and West…. By the sixteenth century they had make Turkey one of the great powers in the Mediterranean…. After 1517 the Ottoman Sultan, the Grand Turk, became the caliph of all the faithful….It was clear that Islam was enjoying a general renaissance under Turkish and Sunni influence, which everywhere entailed total victory for Muslim orthodoxy and traditional religion. *Power reasserted itself; independent thinking was curbed; an iron regime was imposed.*' (R4: pp. 87-89) (Italics mind)

1337 - 1453	The Hundred Years War between England and France.

The Renaissance period in Europe from the 14th to the 17th century, can be considered as a transition period from the Middle Ages to modern western civilization. It started as a cultural movement in Italy and later spread to the rest of Europe, marking the beginning of the Early Modern Age.

{Losing the control of Levant and facing the rise of Ottoman Empire, the Western countries were handicapped in their daily life. The values of rationalism and knowledge rose with the new possibilities and competitions under the '3-inventions epoch'. The Western Civilization was migrating back to the Greek rationalism, elitism and individualism. This marked the beginning of the early modern age.}

The 3-inventions epoch and the new Medi-sea Era

{The 1400s was the 'Age of Discovery'. With the advances of new technology, the world shrank to the ancient medi- sea environment over time. Led by Portuguese and Spanish exploration of the Americas and the coasts of Africa, Middle East and India, they initiated the global colonialism or imperialism in the '3-inventions epoch'. The Western Civilization not only gradually migrating back to the traditions of militarism, colonization and slavery of the Classic medi-sea civilization, but also the traditions of rationalism, elitism, individualism and liberty among citizens.}

1400s	During the 15th century, Portuguese sailors explored progressively along the coasts of Africa and Atlantic. By finding the source of the lucrative spice trade, the Portuguese could reap the profits for themselves and made further ventures that finally resulted in Vasco da Gama to reach India in 1498. The exploration in African coast also marked the legitimized slave trade by Pope Nicholas V under the Roman Catholic.
1517	**The new Medi-sea Era and decline of religious power** Martin Luther (1483-1546) wrote his 95 theses as a protest against the selling of indulgences published *On the Babylonian Captivity of the Church*, and *On the Freedom of a Christian.* The works formed the doctrine of the Priesthood of all believers and denied the authority of the Pope to interpret the Bible. They outlined the divergences of Protestant practices and beliefs from the Roman Catholic. This exemplified the declining collectivity in the Western civilization.

The Weakening of the Medi-desert Civilization in the competitions through knowledge and technology

Besides losing the benefits from the monopoly of the Spice Route after Vasco da Gama reached India in 1498, faced with crushing defeat of the Ottoman Turks at the Battle of Lepanto in 1571 against the Holy League led by Spanish admiral off western Greece, Ottoman never again be able to recover their naval supremacy in the Mediterranean sea. After the 1580s, the great Turkish armada fell into decay and the fleet simply disintegrated in port. (Braudel, 1949, 1995: p. 1088)

The triumph of Medi-sea Civilization

During the 16th and 17th centuries, England, France and the Dutch Republic established their own overseas empires, in direct competition with each other. The most populous emigration in the 1600s was the England. After a series of wars with the Dutch and French, England dominated the North America. Slavery was a legal institution in all of the 13 American colonies and Canada which was endemic in Africa.

1618-48	Thirty Years War in Europe
1698	The Savery's steam engine was commercially used. {The event marked the beginning of the 'engine epoch'. Engine power started displacing animal power over time.}
1723	Birth of Adam Smith: the founder of modern rational economic theory
1776	Independence in the Americas: the new nation led the reversion of the Western Civilization back to most of the values and practices associated with Classic Greek-Roman traditions – rationalism, elitism, individualism, rule of law, religious pluralism and militarism.

The end of the 18th and early 19th century experienced the first era of decolonization. Most European colonies in the Americas gained their independence. Spain was irreversibly weakened after the loss of the New World colonies.

However, the 19th century was also the era of New Imperialism. The pace of colonization rapidly accelerated. The height of which was the Scramble for Africa in which Belgium, Germany and Italy were participants. This was made possible by the second industrial revolution that included applications of modern railways and metal-hulled steamships. Also, around 1890s, the invention of hydroelectric power enabled the rapid industrialization of coal-deprived areas such as northern Italy.

1803-1914	The Napoleonic Wars (1803–1815) and more limited wars in Europe.

1833: Discoveries of semiconductors sparked the epoch of 'communication and computer'.	
1914-1918	The First World War .
1922	The end of Ottoman empire that lasted for more than 600 years. It marked the decline of the Medi-desert Civilization in the region under the advance of the new Medi-sea era in the 'engine epoch'.
1939-1945	The Second World War. The end of the War started the second phase of decolonization.
1999	Portugal gave up the last of Europe's colonies in Asia, Macau, to China. It marked the ending of colonial era sparked by the 3-inventions in the regions which had lasted for six hundred years and the beginning of the Modern Medi-sea Era.
Conclusion: The Modern Medi-sea Era	
{As noted in Black (2008: p. 6), the western and eastern Christians drew some wildly different political conclusions from the same sacred texts. Both philosophy and the appeal to reason as an independent guide died out in the Muslim world; while in the West they became established and respectable pursuits and methods of argument. After the world entered the 3-inventions epoch, the global environment largely returned back to the ancient Mediterranean sea environment, though in a much larger scale. This new medi-sea environment triggers a new era of international competition through maximizing national power by optimizing the choice variables on collective identity building tools (the soft power) and rationalism that is correlated with knowledge and technology. The evolution and triumph of Medi-sea Civilization in the new medi-sea era illustrate that the geno-success among civilizations depends on the flexibility in adjusting their collective beliefs and practices according to the changes in political, technological and/or natural environments. When the world enters a new era of effective competition that is characterized by the rejuvenation of ancient civilizations and modernization of emerging economies, it demands new adjustments on both Western and Islamic civilizations that evolved under the zero-sum competitive environment for avoiding the potential reincarnation of various clashes and humanity disasters in the present on-going evolution process.}	

Notes: i. The statements inside {…} are those of the comments/opinions/ideas of the author. The function of this table is for complementing the theory proposed in this paper rather than tracing the historical facts. Many information is drawn from open domains and mostly, directly quotes from related books. ii. The key sources of information include: R1) The History Guide, Lecture 7, 8; http://www.historyguide.org/ancient/lecture8b.html, accessed 22 Jan. 2016; R2) Black (2008); R3) Braudel (1987, 1993); R4) http://www.newworldencyclopedia.org/entry/History_of_science_and_technology_in_China; access: 22 Jan. 2016.

C1. The Formation of Medi-sea and Medi-desert Civilizations

According to The History Guide, Lectures 7 & 8, the ancient origin of the Western civilization can be traced back to those of the Greek: 'It has been said that the Greeks are the first ancient society with which modern western society …. feels some sort of affinity. The ancient Greeks were clearly a people who warred and enslaved people. They often did not live up to their own ideals. However, their achievements in the areas of art, architecture, poetry, tragedy, science, mathematics, history, philosophy and government were of the highest order and worthy of emulation by the Romans and others. Western thought begins with the Greeks, who first defined man as an individual with the capacity to use his reason. Rising above magic and superstition, by the end of the fifth century, the Greeks had discovered the means to give

rational order to nature and to human society.'[16] In addition, the rationalism tradition of the civilization can be attributed for the necessity of winning wars for survival: 'The political and social upheaval caused by the Persian Wars as well as continued strife between Athens and Sparta (see Lecture 7) had at least one unintended consequence. In the 5th century, a flood of new ideas poured into Athens. … As a result of the experience of a century of war, religious beliefs declined. Gods and goddesses were no longer held in the same regard as they had been a century earlier. *I suppose we could generalize and say that the Persian and Peloponnesian Wars taught that the actions of men and women determine their own destiny, and not "Moira."*' (italics mind)

The medi-sea and the competitive environment responsible for cultivating the ancient Greek civilization is also recorded in Rodgers (1937, 1964): 'By the time of Greco-Persian Wars, navel organization was further advanced. Many of the Grecian city states were dependent on their manufactures and commerce for their food supply, as their farm lands were not equal to their nourishment. Indeed, all the shores of the Levant were the homes of shipping and commerce. When rival city states found cause for dispute, it was natural and easy for them to organize their pirate adventurers into navies and seek national objectives.' (p. 4) The development of rationalism, technology and individualism were facilitated by the keen competitions among the loosely connected states along the coastlands of the Mediterranean Sea that allowed people to move around easily. Talents and innovations were highly rewarded while suppressions were costly in the environment.[17] The modern Western civilization that includes the values and practices of rationalism, elitism, individualism, liberty among citizens, competition and militarism are largely the heritage of the ancient Greeks. The traditions can be modeled as the survival traits to maximize the P_N that equals to P_S as specified in (E5). The optimization condition of (E5) with respect to r implies equating the MC and MB of r such that:

$$\lambda\left(\frac{\partial \ln S}{\partial r} + \frac{\partial \ln F}{\partial S}\frac{\partial S}{\partial r}\right) \ = \ \frac{\partial \lambda}{\partial r}\log(nSF); \text{ or,}$$

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[16] http://www.historyguide.org/ancient/lecture8b.html, accessed 22 Jan. 2016

[17] The environment led to the Greek rationalism tradition is similar to that of the China during the Warring states period as described in Mo (2005).

$$\lambda \left[\frac{\partial S}{\partial qM} M \frac{\partial q}{\partial r} \left(\frac{1}{S} + \frac{1}{F} \frac{\partial F}{\partial S} \right) \right] \; = \; \frac{\partial \lambda}{\partial r} \log (nSF) \tag{E8}$$

The LHS is the marginal cost of r. It includes the reduction in S directly when the rationalism/knowledge/technology of manpower decreases and also, reduces SP indirectly through lowering F. With P_S predominantly determined the P_N of the city-states in the ancient medi-sea environment, the substantial negative direct and indirect effects of r in lowering P_N would dominate its benefit of raising λ captured by the RHS of (E8). This keen competition in technology related to sea warfare can explain several common characteristics of the Classic Greek-Roman civilization. They include the emphases on rationalism, education, elitism and the practice of polytheism. That is, it is characterized by high level of rationalism with low level of religious indoctrination. For substituting the function of r, they enhanced the sense of collectivity among stakeholders through kinship and common language by adopting monogamy, and using education and imposing strict rule of law to promote desirable behaviors.[18] These substitutes for r allow the small city-states to maintain the sense of collectivity and desirable actions among stakeholders.

In contrast to the medi-sea environment, the P_N of the Medi-desert nations predominantly relied on manpower. In the logarithmic form of (E7):

$$\log (P_N) = \log (P_L) = \lambda \log [n \, A(G, M)F(M)] \; ; \tag{E7.1}$$

The MB of r equals : $(\partial \lambda / \partial r) \log(nAF) > 0$; while r has minimal negative effects on A and F. This effect of r on P_N provides the reason for the full integration of king's power with religious indoctrination in the Muslim world. As described in Black (2008): 'Muhammad …was a war leader; … The first Muslims believed they had a mission from god to subdue the world, by force if necessary. … the caliph held the monopoly of the legitimate means of coercion … those refused to submit to Islam … were to be killed'. (p. 35)

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[18] 'Greek and Roman men were not allowed to be married to more than one wife at a time and not meant to cohabit with concubines during marriage, and not even rulers were exempt from these norms.' (Scheidel, 2008) Besides other possible explanations, using sentiments generated from kinship, common mother tongue, citizenship affiliations and privileges enjoyed by stakeholders to substitute the function of monotheistic religion for generating the sense of collectivity may explain the value and practice of monogamy that has distinguished the Western civilization sharply from other civilizations, as noted in Scheidel (2008).

The environment motivated the invention and instrumentalization of the Islamic monotheistic religion for nation-building in the medi-desert civilization can be understood through the descriptions about Muhammad and the situation of Arabia in Braudel (1987, 1993): 'Muhammad's decisive achievements took place between about 610 or 612 and the date of his death in 632. Arabia at that time was fragmented by rival tribes and confederations, and wide open to foreign influence and to the colonizing efforts of Persia, of Christian Ethiopia, of Syria and of Byzantine Egypt. Without Muhammad, it would never have achieved unity and, thus strengthened, …' [R3: p. 45]

C2. The Evolution of the Medi-sea Civilization: The Byzantium Christianity

According to the records in the Old Testament, Exodus:[19]

> Moses saw that the people were running wild and that Aaron had let them get out of control and so become a laughingstock to their enemies. So he stood at the entrance to the camp and said, "Whoever is for the LORD, come to me." And all the Levites rallied to him. Then he said to them, "This is what the LORD, the God of Israel, says: 'Each man strap a sword to his side. Go back and forth through the camp from one end to the other, each killing his brother and friend and neighbor.'" The Levites did as Moses commanded, and that day about three thousand of the people died.

This record in the Old Testament demonstrates the power of monotheistic religion as a tool for nation-building. It raises the solidarity of the people, resolves social dilemma and promotes collective actions that violate the natural instinct, rationality and self-interest of the people. Unlike the nations in the Middle East that were largely land-based in history, the medi-sea civilization had experienced radical changes in its environment. While the Classic Greek-Roman civilization was purely cultivated among the small city-states around the eastern part of Mediterranean Sea, the Roman Empire, "At its height, in the 2nd century AD, it had a population of around 60 million people spread across 5 million square kilometres …. stretched from Hadrian's Wall in drizzle-soaked northern England to the sunbaked banks of the Euphrates in Syria; from the great Rhine-Danube river system, ….flat lands of Europe …. To the Black Sea, ….North African coast …. Nile valley in Egypt…. encircled the Mediterranean.

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[19] https://www.biblegateway.com/passage/?search=Exodus%2032, access: 8 April 2016.

This was the Romans' internal lake, complacently referred to by its conquerors as mare nostrum – 'our sea'." (Kelly, 2006: p. 1) In view of the huge and diverse territories and people had to be governed by the Empire, first, an optimal mix of SP and LP was necessary; and second, the traditional substitutes for r like kinship and common language adopted in the Classic Greek-Roman city-states became ineffective. Under the situation, a monotheistic religion became a necessity for solving the problems associated with social dilemma.

Suppose a nation allocated a given resource (C) for P_S and P_L to produce P_N. With $\lambda = 1$, the P_N only depends respectively on the physical inputs allocated for P_S, denoted by P_{SI}, and P_L, denoted by P_{LI}. In combination, they produce P_{NI} with a Cobb-Douglas production function, such that:

$$P_{NI} = (P_{SI}{}^{\alpha}\ P_{LI}{}^{\beta});$$

$$\alpha \geq 0 \text{ and } \alpha + \beta = 1;\ P_{SI} = nSF, \text{ and } P_{LI} = nAF \text{ respectively;} \tag{E9}$$

Introducing λ into the model, the king's objective is to choose r for maximizing:

$$P_N = (P_{NI})^{\lambda} = [(nSF)^{\alpha}\ (nAF)^{\beta}]^{\lambda} \tag{E10}$$

The first order condition implies:

$$\boldsymbol{\alpha\,\lambda\,\frac{\partial S}{\partial qM}\,M\,\frac{\partial q}{\partial r}\left(\frac{1}{S} + \frac{1}{F}\frac{\partial F}{\partial S}\right) = \frac{\partial \lambda}{\partial r}\,\log\,(P_{NI})} \tag{E11}$$

Given the resource C that is equal to: $c_1\ P_{SI} + c_2\ P_{LI}$, with c_1 and c_2 is the minimum unit cost of producing P_{SI} and P_{LI} respectively, in optimal allocations, c_1 and c_2 equal to their respective marginal products of P_{SI} and P_{LI}. And α and β portions of C will be allocated for P_{SI} and P_{LI} respectively. As discussed in section C1, in the ancient Greek medi-sea environment, P_N was predominately determined by sea power and α equals to one with $P_{NI} = nSF$; on the other hand, α equals to zero in the medi-desert environment with $P_{NI} = nAF$. Other things being equal, with $\alpha = 1$, the marginal cost of r in the ancient Greek environment were substantially higher than that of the Roman Empire that had to maintain a significant level of P_L, that is, α is less than 1. This can explain why after centuries of suppression, the Christianity monotheistic power was finally incorporated by the king's power in the Roman Empire. The civilization of East Roman

Empire was originated from the Classic Greek-Roman medi-sea traditions. However, Constantine I reorganized the empire, made Constantinople the new capital in 330 A.D. and legalized Christianity. The Latin culture was gradually replaced by the Greek culture and characterized by Orthodox Christianity. As concluded in Black (2008: p. 2): 'the West gradually became distinct in religio-political culture and organization from the East Roman Empire after the transfer of the capital to Constantinople ….'. Moreover, "We find that the idea of holy 'war'– going to war on religious grounds, either to defend one's faith or to disseminate it – far from being peculiar to Islam, was more or less invented by the late Roman empire, and adopted by the new nation-kingdoms of Europe." (p. 5) This migration of the Western civilization from the Classic Greek-Roman rationalism to that of the Roman Christianity can be understood as the adjustment to balance the costs and benefits of r on P_N in view of the changes in the national environment.[20] The East Roman Byzantine Empire controlled the gateways linking the coastlands around Black Sea and the Mediterranean Sea as well as the Levant and vase landmasses including the area about the current Turkey and Egypt. The survival fitness of the empire depends on the optimal allocation of resources for sea as well as land powers to strengthen NP. During the reign of Justinian I (r. 527–565), empowered with the monotheistic religion, the Empire reached its greatest extent after reconquering much of the fallen Roman western Mediterranean coast. Justinian I also conducted the uniform rewriting of Roman law and established a unified code of law for the entire empire. The success in utilizing the monotheistic indoctrination and also, strengthening the rationalism of the legal system, may explain the ability of the East Roman Empire to last for another thousand years after the Western Roman Empire fell in A.D. 476 .

The above analyses explain the causes of the differences in the Classic Greek-Roman and Islamic civilizations as well as the factor driving the evolution of the Western civilization. The optimal levels of religious indoctrination, r^*, in particular, or, the rationalism levels of collective beliefs and practices in general, are determined by their cost and benefit

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[20] The migration from Greek rationalism tradition towards religious indoctrination are exemplified by shutting down the schools established in 387 B.C. by Plato, The Academy, and also, the Lyceum school started by Aristotle in 335 B.C.. Both were shut down by Justinian I in A.D. 529, the Byzantine Emperor. The motivation of adopting the monotheistic religion in the East Roman Empire was no different from the adoption of Confucius doctrine by the Han Dynasty happened more than two thousand years ago in imperial China. (Mo, 1995)

calculations for maximizing their survival fitness in the process of competitions under different environments. The theory implies:

$$r^* \text{ (Classic Greek-Roman, } \alpha=1) < r^* \text{ (East Roman Empire, } \alpha<1) < r^* \text{ (medi-desert nations, } \alpha=0) \quad \text{(E12)}$$

D. The 3-inventions Epoch and the New Medi-sea Era

Along with the Mongol invasions (1202 - 1405) into the Middle East, gunpowder spread to the Arabs from China along the Silk Road in the 13th century and thence to Europe. According to English philosopher Francis Bacon writing in *Novum Organum*: 'Printing, gunpowder and the compass: These three have changed the whole face and state of things throughout the world; the first in literature, the second in warfare, the third in navigation; whence have followed innumerable changes, in so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries.'[21] We call the era driven by the 3-inventions the '3-inventions epoch' in the regions. It is followed by the 'engine epoch' marked by the commercial applications of the steam engine in A.D. 1698 which started displacing animal power as the major source of energy over time. The inventions in the epochs shrank the world into the environment similar to that experienced by the ancient Greeks and created the 'New Medi-sea era' in the world.

If we define the relative strength of the medi-sea and medi-desert civilizations in the region by considering which one is in control of the Levant, the Islamic Ottoman Empire benefitted more from the 3-inventions in the early stage of the epoch. Ottomans were leaders of the Islam Turkish warriors. They entered Anatolia with Turkmen nomads who flee from the Mongols. They overwhelmed Byzantium and occupied eastern and central Anatolia during the 12th century. The Turkish Empire extended to Balkans between 1362 and 1389 and overthrew the Byzantine Empire with the conquest of Constantinople in 1453. As stated in Braudel (1987): 'With the return of better times and a recovery in the world economy, broadly in the sixteenth century, Islam once more profited from its intermediary position between East and West…. By

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[21] New World Encyclopedia, accessed 22 Jan. 2016:
http://www.newworldencyclopedia.org/entry/History_of_science_and_technology_in_China.

the sixteenth century they had made Turkey one of the great powers in the Mediterranean…. After 1517 the Ottoman Sultan, the Grand Turk, became the caliph of all the faithful….It was clear that Islam was enjoying a general renaissance under Turkish and Sunni influence, which everywhere entailed total victory for Muslim orthodoxy and traditional religion. Power reasserted itself; independent thinking was curbed; an iron regime was imposed.' (pp. 87-89) This largely summarized the evolution process of the Islamic Medi-desert Civilization under the 3-inventions epoch. With the sad and unfortunate ending of 'independent thinking was curbed; an iron regime was imposed', the failure of the civilization is inevitable with survival fitness based on the power of engines, venturous aptitude and innovations in the new medi-sea era.

On the other hand, facing immense challenges from the Ottoman invasions, through reincarnating their ancient Greek traditions, the western nations rapidly captured the opportunities opened up by the 3-inventions that increasingly shrank the world into the environment of ancient Mediterranean Sea. Portuguese sailors explored progressively along the coasts of Africa and Atlantic during the 15th century. By finding the source of the lucrative spice trade, the Portuguese could reap the profits for themselves and made further ventures that finally resulted in Vasco da Gama to reach India in 1498. The exploration in African coast also resulted in the legitimized slave trade by Pope Nicholas V of the Roman Catholic.

The 1400s was commonly known as the 'Age of Discovery'. The successes of the Portuguese and Spanish exploration of the Americas and the coasts of Africa, Middle East and India led the global colonialism or imperialism of the western nations. The Western Civilization not only gradually migrating back to militarism, colonization and slavery of the Classic medi-sea civilization, but also the traditions of rationalism, elitism, individualism and liberty among citizens caused by the keen competitions for the new opportunities and benefits made possible by the 3-inventions. With increasing resources, manpower, trading opportunities and ever improvements in technology and production methods, both naval and land warfare experienced ever advances in artillery, battle fleets and larger armies. Driven by the new and imperious needs of improving warfare technology and power to compete for benefits or survival, modern monarchy states served by 'functionaries' developed in most European countries including Spain, France and Britain which acknowledged no higher authority.

Under the desperate competitions in technology and innovations in both P_L and P_S in this 3-inventions epoch, the damages of r became much higher and the optimal level of religious indoctrination declines.[22] The migrating back to the Classic Greek-Roman rationalism among the western nations was exemplified by two events. The first was the Renaissance period in Europe that lasted from the 14th to the 17th century. It started as a cultural movement in Italy and spread to the rest of Europe later, marking the beginning of the early modern age. Another was the writings by Martin Luther (1483-1546). He wrote his 95 theses as a protest against the selling of indulgences. His works formed the doctrine of the Priesthood of all believers and denied the authority of the Pope to interpret the Bible. He outlined the divergences of Protestant beliefs and practices from the Roman Catholic. The events exemplified the resume of individualism and rationalism in the Western civilization under the new medi-sea environment.[23]

The new medi-sea development shared many similar characteristics as that of ancient Mediterranean Sea. As noted in Braudel (1987, 1993): "Those ten centuries, broadly speaking, were an extraordinary 'colonial' period, during which the Greeks dominated an immense ….As colonists, they founded cities and great ports like Antioch .… formed vast States….they did not mix with them …. In fact, the tiny Creco-Macedonian people colonized this vast tract of Asia as Europeans later colonized Africa, imposing their language and administration and imparting some of their dynamism." (p. 43)

The 'global renaissance' mechanism of 'competition, rationalism, modernization and colonization' in the new medi-sea era continues in the Western civilization which finally result in the total domination in technology, military and economic spheres by the powers of the Western civilization. With the advances of technology, the monopoly positions of the medi-

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[22] Mathematically, LPI in (E10) no longer depends on animals (A) during and after the 3-inventions epoch but is replaced by the power of engine, production capacity and technology (T) that is negatively related to r.

[23] Another side of the increases in rationalism and individualism is the decline in religious power. For instance, as observed in Braudel (1987, 1993): 'With the eighteenth century, there was a great reverse. This time, material progress did not serve the cause of the church. It went with a scientific philosophic movement which on the contrary opposed the church in the name of progress and reason.' (p. 338)

desert powers on the Silk Road and Spice Route will never be reincarnated in the future. The geno-strategies of the nomad land traders cultivated under the medi-desert environment have no advantage in the competitions based on industrial and technical capacity. The new medi-sea environment has irreversibly raised the survival fitness of the Western rationalism civilization relative to the Medi-desert religious indoctrination civilization.

Most nations today are facing similar problems as the Roman Empire: effective tools are needed to promote the sense of collectively among diverse peoples, interests and sense of identity domestically and internationally. The experiences of the Roman Empire suggest that the Classic Greek-Roman rationalism cannot solve social dilemma problems when nations have diverse interests among peoples and territories. Similarly, the religious indoctrination Islamic strategy is also not the best survival strategy in the modern era. The geno-strategies evolved in the zero-sum competition for land sites inherited by the Western as well as the Islam civilizations are likely to cause domestic and international tensions and clashes that will linger on in the foreseeable future.

However, the potential clashes will be substantially reduced if the adherers of the Western and Islamic civilizations can recognize and be empathetic to the cause of their differences and conflicts, understand the desirable direction of adjustments and are flexible enough to adapt their traditional beliefs and practices to raise their survival fitness in this 'modern medi-sea environment'. Our modern world is now empowered with much richer stock of knowledge, technology, values, practices and tools available to all humankind that can potentially allow us to escape the reincarnations of war and peace, hell and heaven, misery and self-actualization that repeated for thousands of years in the region.

In the modern medi-sea environment, nations with weakening collective identity building infrastructure will suffer from increasing domestic socio-economic stresses and move towards domestic clashes and disintegration. Nations suffering from sub-optimal values and practices will be weakened over time in their relative economic and military powers. An important arena of competition across countries today is the effectiveness of 'soft power', that is, their capability of building collective sense of identity among diverse communities and nations while minimizing its potential negative effects on rationalism, knowledge, innovation, technology and economic development. As demonstrated in this paper through reviewing the evolution of the Western civilization lasted from Ancient Greek to the present stage, there are

no long-lasting optimal collective beliefs, practices and forms of social and public governance. The only thing that is persistent is the continuous adjustments towards optimal choices for balancing rationalism and sense of collectivity according to the changes in environment, stock of knowledge, technology and options available for maximizing the national fitness of survival.

E.   Conclusion

To the best of our knowledge, this is the first attempt to explain the formation and evolution of the Western and Islamic civilizations based on the competitions on national power and survival fitness among nations. The apparent repeated 'clash of civilizations' between the Western and Middle East powers was in fact caused by the competitions for controlling key trade routes and sites, in particular, the valuable Levant located in the junction of Mediterranean Sea and the fertile Crescent. In the competing process, the Western medi-sea and Middle East medi-desert powers developed their own collective beliefs and practices to raise their warfare powers according to their respective environments. When the Roman Empire became increasingly land-based, we observe that the original medi-sea Greek-Roman civilization and the Islamic medi-desert civilization converge. In reverse, during the 3-inventions and the engine epochs, the Western civilization was gradually migrating back to the Classic Greek-Roman rationalism. We conclude that 'civilization' is just a tool to achieve geno-success and prosperity of the adherers during their process of evolution. Since habitats do not change drastically, this implies that modernization of each community can best be achieved by modifications based upon indigenous practices and cultures rather than total importation of the other civilizations. Similar to bio-diversity, cultural diversity is just part of the natural evolution process. When environment changes, given enough time, habitants will be motivated to and, in the long run, find their own ways to adapt and survive.

After understanding the mechanism that molds the characteristics of the Western and Islamic civilizations, the 'clash of civilizations' suggested in Samuel Huntington (1993; 1996) that predict the 'fault lines between civilizations will be the battle lines of the future' becomes conditional, avoidable and can be engineered. Instead, given the current stock of knowledge, technology and enormous potential gains from exchanges, we can make the interactions between diverse cultures to be enjoyable and productive experiences of mutual learning, enrichment and division of labor while avoiding potential dynamics driving towards

undesirable outcomes. Similar to the interpersonal relationship, with immense possibilities of international positive-sum cooperation in the modern environment, whether clashing or benign relationship to be established between civilizations depends on the mold of interactions and whether they can respect and accept the differences of each other. The diversities are just a reflection of humankind innovation capability in devising socio-political infrastructures for enhancing the collective power of the communities during their specific paths of evolution. With international infrastructures facilitating global division of labor and exchanges, the diversity is mutual beneficial rather than the cause of clashes and instabilities. After reviewing the evolutionary experiences in the regions, it seems that the Greek, Roman, Byzantine and Islamic geno-strategies will not be effective for resolving the current resumption of the conflicts between the Western and Islamic civilizations in this modern era. We need innovative tools to prevent the bitter and bloody experiences in the regions to reincarnate again.

Are we heading towards global clashes of civilizations, clashes of vested interests and finally, entering a vicious cycle of social dilemmas driving towards a third detrimental world war in this century? The conclusion of our analyses is that this is not a destiny but a choice among the governments of the nations. Comparing to the evolution path of dinosaurs, we are now knowledgeable enough to study and understand the mechanism driving the evolution paths of our own economy, politics and civilizations. It becomes transparent that we are the only 'civilized' animal in the current small global village and also, we are different from dinosaurs: it seems that we are the only species ever survived on the Earth which is empowered with the knowledge and capability to predict, choose and change our own future intentionally for raising our survival fitness and wellbeing.

It takes millennia of miserable experiences for us to understand that the mechanism driving civilization diversity is no different from that of driving biological diversity. The current attributes of a 'civilization' are just the remnants of the survival traits formed in the long historical past which become part of the factors driving the current stage of evolution process. Can we just jump across the enduring miserable slavery process under the hands of nature and intentionally facilitate the adjustments of our 'civilizations' for maximizing the wellbeing of us as a whole? If we consider that the r in this paper is just one of the tools for enhancing the sense of collectivity and reducing the problems of social dilemma among diverse communities in this global village, it becomes obvious that we should choose the tool that can

substitute monotheistic religions while at the same time does not damage rationalism, innovations and economic development, if not promoting them. In the small city- states of the Classic Greek-Roman period, they used kinship, education, sense of citizenship and reciprocal laws to substitute the function of r for maintaining solidarity among stakeholders while using slavery system for supplying common manpower. We are more fortunate today. Inspired by the historical evolution of the logographic-farmers Chinese civilization, we can have the stock of knowledge and choice not available to the ancient Greeks and Romans. If we can intentionally maintain an international system of independent political entities while institute a modern global logographic writing system, we can raise the sense of collectivity and empathy among diverse nations, while at the same time enhance virtuous competitions and rationalism among all communities through effectively sharing the global stock of knowledge, feelings and technology contributed by all communities.[24] Anyway, we are no longer limited by the small medi-sea and medi-desert zero-sum game environment. In this 'universe era', our frontier is only limited by the effectiveness to apply our stocks of knowledge, technology and innovations on both 'hardware' and 'software' available for building up a mutual beneficial, rational, interactive, empathetic, cooperative and liberal environment to all communities in this small global village where, no person is able to escape at our current stage of evolution. Instead of following the geno-strategies evolved in the zero-sum game environment and reincarnating the associated vicious cycles generated by the social dilemmas among peoples and nations, we have to construct an inclusive and empathetic global environment before it is too late.

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[24] Mo (2007; 2008; 2014; 2015).

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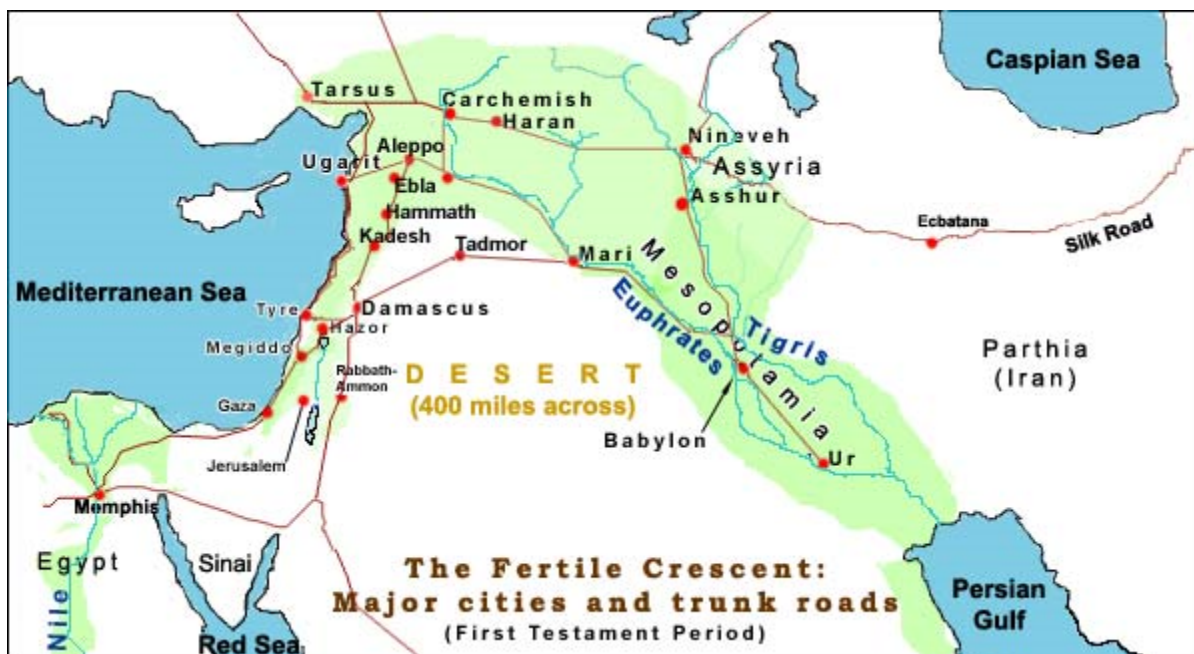Van Creveld, Martin (1989, 1991) *Technology and War, from 2000 B.C. to the Present*, The Free Press, New York.

Appendixes:

A. The Key Trading Routs of the Medi-sea and Medi-desert Nations

The Silk and Spice Routes

Source: http://en.unesco.org/silkroad/about-silk-road ; access: 6 Jan. 2016;

B. The Fertile Crescent

The Fertile Crescent: Major cities and trunk roads (First Testament Period)

C. The Crusades

the CRUSADES

Source: **http://miwilliamsesl.pbworks.com/w/page/8599905/Task%202%20Mapping%20the%20route**; accessed: 6 Jan. 2016.