

Suspicion or Faith: Understanding the Cultural Roots of Iranian Public Policy towards Science and Technology

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Today, there is a plethora of literature on the process of accelerating growth of science and technology in Iran. Assuming technology as a social construct of modern society, and in the light of Ricoeurian hermeneutic approach, this paper aims, first, to show the resemblance of the current discursive relationship between the Iranian society and technology to a "discourse of faith" and, second to explain how this discourse has roots in the preceding one which can be considered as a "discourse of suspicion". To do so, the paper first, builds a conceptual model based on the Ricoeurian theory of interpretation, where, by analogy, modern technology is compared to the text and the user of the technology as its reader. Then, it introduces two episodes of relationship between technology and its Iranian users in the public policy of the post-revolutionary era: distancing and appropriation. It concludes that the current growth of scientific endeavors serves as the material base for an Iranian discourse of techno-nationalism; a new self-identification which motivates the elites to develop new bases for national self-esteem.

Keywords: Iran, Discourse Analysis, Hermeneutic-phenomenological Approach, Narratives, Techno-nationalism, Discourse of Suspicion.

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Introduction

When Rashed al-Ghannushi, the leader of Islamist Party of Tunisia, was asked, in the aftermath of his victory, what he liked about the Islamic Republic of Iran, he replied: "Technology¹, the technology in the situation where you have had to face sanctions for 30 years is a great achievement" (Farahmand, 2011).

The "technology" al-Ghonoshi refers to, also attracted attention of some international technical journals and mass media. In fact, it is now for three consecutive years that several international observers have tracked down an unusual growth rate in scientific development in Iran. Science Matrix, a prominent data analysis company in Montreal, Canada, was the first to report that "Iran embarked on one of the fastest build-up of scientific capabilities the world witnessed during the last two decades" (Science-Matrix, 2010:5). This observation was restated by *New Scientist* columnist, who called the year 2010 the year of Iran in which the scientific output grew 11 times faster than the world

average, faster than any other country (McKenzie, 2010). And for the following year, the Iranian rate of growth was estimated to have accelerated up to 18-fold, more than the average rate of science output in the world, (Coghlan, 2011), increasing the yearly number of peer-reviewed science publications from 806 in 1996 to 25.880 in 2010 (SCImago, 2011). And finally, *Nature* reports that "Iran with 20 percent growth rate in publication of the scientific papers tops all other countries of the world" (Van Noorden, , 2011).

Vioda (2008: 5), citing French philosopher Paul Ricoeur, states that people approach artifacts and experience both from position of faith and from position of suspicion. While the current trend of technology development seems to exhibit the complete faith of the Iranian society in technology, one cannot help remember that some thirty years ago, in the course of actions, which led to the Cultural Revolution in the early 1980s, a completely different approach, paraphrasing with Ricoeurian jargon, an approach of suspicion towards technology was dominant in the country.

1. I, hereafter, use Technology with Capital T to refer to the modern technology. The words of modern technology and western technology are used interchangeably.

Drawing on the approach of Marcel Valérie (2001), this paper tries to offer an understanding of dynamism of change from the discourse of suspicion in 1980s to the one of faith in technology in 2000 and after, and the reasons for this radical shift in public policy by analyzing the cultural roots and the contemporary historical context of post revolutionary Iran. The core assumption of the paper is that in the course of the engagement of post revolutionary Iran with modern technology, there are two consecutive episodes: 'distanciation' and appropriation. When the society moves from the stage of 'distanciation' to the stage of appropriation, major radical transition in the public policy happens, since these two episodes represent not only two different attitudes towards the technology, but they also yields two different processes of the self reflection and collective identity.

National identities reflect aspirations that, when fulfilled, enhance national self-esteem. Regarding science and technology, the images that contemporary social elites are willing to project is quite different from the one that it had in mind to consolidate their self esteem. Today, it entails a fresh collective self-imagination and a new national narrative which defines selfhood

(Iranians) as the creator and innovator of technology versus otherness (Western countries), catching up, and sometimes forging ahead in the technological competition.

In the past episode, technology was construed as a means for subordination and alienation of the third world. The relationship between the west and the rest was antagonistic. In this episode, the nature of the dichotomist relationship between "selfhood" and "otherness" tends to be more of competition than hostility.

Literature Review, Conceptualization, Methodology and Level of Analysis

Since 1980, a new chapter has opened up in the sociological enquiry with the subject of science and technology studies (S&T Studies) maintain social shaping of technology with three different branches: Social Construction of Technology (SCOT) (Wiebe et al., 2012), Actor-Network Theory (ANT) (Latour, 2008) and Large Technical System (LTS) (Mayntz, et al, 2008). This field of study presumes technology as a social construct. Therefore, technology does not determine human action, rather, the human action shapes technology. Since then, the field of S&T studies relies on the

social constructivist school of thought. According to this school, in addition to technical elements, technology carries social elements, social structure, norms and forms of life within. Modern technology is a construct of the modern society and is obviously compatible with the modern form of life in the western countries. The man and the machine do not have distinct ontology. They both extract their meanings and constitutions from modernity¹.

However, materialized in "things" e.g. in machines, blue prints and even embodied in humans, as experience and tacit knowledge, technology can transfer and travel from its birth place to other places with radically different and probably non-modern social settings. At times, this dissonance causes tensions, creating social stir-ups in recipient countries. In this case, technology could be interpreted by the political elites as cultural intruder, economic tool for exploitation of natural wealth and a menace to the

indigenous and traditional collective identity. Yet, there are times when technology is embraced by local elites and used as a tool for lending new and modern national identity and an instrument to acquire a better status at the international level. Modern technology in this case is employed as a material basis for the discourse of nationalism to catch up with industrial countries. Called the "late comers" (Chung Anh Tran, 2011), in development studies, they are countries that try to fill their gap with the industrialized countries. They are also called "newly industrial countries" (Chowdhary 1996), "emerging economies" (Reddy, 2011) and their states is referred to as "developmentalist state" (Pirie, 2007) and their nationalism "techno-nationalism" (Ostry,.Nelson, 1995; Edgerton, 2007, Atsushi Yamada , 2000; Sandro Montresor, 2001).

For Earnet Gellner (2007), the nationalism is a widely shared way of adapting to a modern, industrial and globalizing world. Modern nationalism was thus vital to modernity, not as a way of escaping from a globalized cosmopolitan modern world, but as a means for participation. Techno-nationalism is a

1. The post-colonial studies emphasized this account on the S&T studies, maintaining that science and technology and society co-constitute each other. (Hardings, 2011: 21) Each provides resources for the development of the other-and this can occur whether such development is politically and intellectually progressive or regressive See Harding Sandra (2011).

discursive tool by which the political elite galvanizes the masses and channels the nationalist emotions into the process of modernization of industry and rationalization of production and bureaucracy. It is important for globalization, since it is a national self-concept derived from a perceived membership in a globalized science and technological production. As nationalism has always a tendency towards militarization, the mix of technology and militarization is often viewed a problematic matter for the world order. But as history witnesses, there are two kinds of techno-nationalism: positive and negative. The members of the Axis Alliance in the Second World War, Germany and Japan, were the exemplars of negative faces of techno-nationalism. The countries of East and South Asia like China and India, which are committed to international peace, represent the positive ones. The latter group have already shown tendency towards a hybrid of techno-nationalism and globalism, the so-called techno-globalism.

What this paper aims to analyze is the domestic dynamics which pave the way to social change and ultimately lead to surfacing of the discourse of techno-nationalism in Iran. Although this

reconstruction is quite contextualized in the Iranian historical background, there are some uncanny similarities between Iranian experience and the Chinese (1974) and Indian (1991) historical turnaround experiences. They are, albeit beyond the scope of this paper and should be thoroughly studied in another paper.

In searching for appropriate theoretical framework among the different layers of social constructivism, I found the framework of "aspirational social constructivism" which deals with the concept of change to be a suitable for explaining the subject of this research. However, since the explanation of this approach about the reasons as to why one new identity comes to dominate all the other forms of past national identities, deals with the factors of rationality and efficacy, I do not think the framework can be employed without any reservation. While for this paper understanding the dynamism of internal change is crucial, it holds the view that neither of such factors as "rationality" and "efficacy" can be objectively determined and thus are not acceptable.

That is why this paper tries to offer a new understanding of the process of change

of national identity while avoiding the non-operationalized subjective factors like human agency, rationalism and efficacy. And for that reason, it chooses Paul Ricoeur's hermeneutic epistemology by expanding his theory of interpretation to technological studies. It should be kept in mind that scholars like Vioda, (2008), and Galgan have already relied on the concepts of action as a text of Paul Ricoeur (1991, 1976) and developed the concept of "Technology as a Text" in the field of S&T studies. Vioda maintains that "technology is a carrier of western civilization, which reproduces the [western] social order and power structure" and Galgan addresses the western technology as a paradigm or experimental model for a more real world – one that men could both make (write) and inhibit.

Following Vioda and Galgan, this paper considers technology in parallel with text by extending the Ricoeurian theory of interpretation, and assumes that the relation between technology and its users matches functionally with the relation between a text and its readers. It, then, infers that society or users of technology go through two episodes of distancing and appropriation in their relationship with the technology and

as a result of the interaction between the inhibited protagonist (narrative identity) in the world of technology (the modern man) and the world of readers (in the case of Iran, non modern man), the users create surplus meaning, i.e. the users of technology transform into creators of technology and, consequently, gain a more complicated modern identity than before.

But what does 'distancing' in the field of science and technology studies mean? As mentioned above, technology carries different social elements along with various technical ones, and based on the paper's analogy between the text and the technology, we can presume that there is a world of technology, where technical and social elements have a relationship as semiotics and semantics have in the world of text. Any attempts to recognize and differentiate technical laws (the semiotics) from social elements of technology can be considered analogous to fixation of meanings and any effort to isolate social elements¹ (semantics) of technology is parallel to the exteriorization of authors'

1. Social organization of production like Taylorian mode of production, flexible mode of production, lean mode of production...and also the pattern of consumption.

intentions from the world of Technology according to Ricoeur's theory of interpretation. Therefore distancing, here has 3 steps: first; de-constructing the technology into its components, second; setting apart the social and technical components of the technology from each other, third; putting aside all the social elements and discard them to have only some sets of techniques and technical laws.

The phase of appropriation is another stage of this process. According to the method of Ricoeur, appropriation means imagining the spectrum of other ostensive and non-ostensive meanings than existing meanings of the words of the text and chooses the one that is aligned with reader's world (Ricoeur, 1976, 1991). In our framework, we follow Ricoeur and start with the speculation on all the possible and feasible social applications of the techniques and technical laws in hand. This stage leads to new product or process (new surplus meaning) (Ricoeur, 1976) adaptable to the local context.

In order to substantiate this argument, citing an example seems to be relevant: The stem cell therapy is a hi-technology which has brought up new promises and prospects for human beings. As an achievement of

rich developed countries, the aim of the R&D centers to develop procedures and medications based on stem cell research had been to cure 'medical conditions' like skin wrinkles and other beauty concerns with huge market in developed countries. Until, research organizations in countries like China, India and Iran entered in this realm and found cell-based cures for such diseases as vitiligo and other skin medical conditions prevalent in the South (Miremadi, 2010, Miremadi et al. 2012).

It might be interesting to remember that this two-staged model (distancing-appropriation) of technology interpretation has been addressed in the literature of innovation studies, under the title of "Constructive Destruction", a subfield of Evolutionary Economics, led by Joseph Shumpeter) albeit with different jargons by Lundvall (2010), Freeman (2012), and Lall (2001). Keeping in mind that since the subject of their study is entrepreneurship and the pertaining policies; the selected level of their analysis is micro-foundation.

In this paper, however, the analysis is categorically at the macro-level, since it focuses on national discourse of technology development dealing with political authority and economic power, identity

formation and its repercussions for national status. At the macro level, discourse of distancing is materialized in radical policies of withdrawal or delinkage from the global market. They associate the word of technology with western technology and condemn the West for using science and technology to extract benefit and exploit the rest of the world. The multinational companies, big markets, intellectual property holders, Bretton Woods monetary institutions, WTO related arrangements and Washington consensus related policies are the symbols of western countries tools within this discourse (Amin, 2011; Harding, 2011). Appropriation, at the macro level, means the recognition of the importance of the modern technology for providing a better life for the people and the endeavor regarding technological adaptation to the indigenous core values. The foreign policy associated with the stage of appropriation is conciliatory towards the industrial world although not concessionary. The public policy coupled with relaxing the ownership laws for foreigners, various policy deregulations, liberalization, privatization, acceptance of the international regimes of technology transfer like WTO, PCT, and developing a national model of innovation

system (Lundvall, 2010, Freeman, 2012).

Theoretically, these two discourses are contradictory and incompatible. Yet in reality, in some cases, most notably in China (1978) and India (1991), the stage of distancing uninterruptedly, transmuted to the stage of appropriation, yielding a huge radical reform in the level of foreign policy and public policy of both India and China.

The significance of this two-staged model of distancing-appropriation is its dialectical relationship. Inspired by Ricoeurian theory of interpretation, it mediates between the two opposite discourses and provides a theoretical ground for the argument which emphasizes the internal dynamism as the prime mover for the policy changes in the aforementioned countries, instead of the international pressures. The second significance of this model relates to its underlying feature stemming from philosophical anthropology of Ricour and concretely explains how the mythic-poetic nucleus of a culture shapes the economic, social and political process of change and continuity (Kerneay, 2004).

To substantiate the argument, the paper proceeds the next part in which the process of the engagement of the Iranian society

with technology will be reconstructed according to the suggested model.

Culture, History, Myths and Narratives

There is a consensus among those who monitor that the Islamic Revolution of Iran in 1979 had its roots in historical and religious aspirations of the nation (Foucault, 1978). In the mix of these aspirations, the infusion of the mythic symbols and historical narratives plays a significant role in the discursive relationship between the society and western technology and its relationship with the power structure, selfhood and otherness. In pre-revolutionary Iran, the important event of the Nationalization of Oil (1951-1953) is often presumed as the most crucial moment, which showed to the outside world the Iranians' national will and determination to control their natural resource as part of their national sovereignty. The defeat of this movement following the Military Coup in 1953 gave ground to the argument maintaining that western countries, who possessed technology (oil industry), did not let Iranians benefit from their natural resources and run their own affairs. This is just one example out of many moments in the Iranians' collective memory, which fed

the discourse of hyper-independency. Some other cases, which of course are less vividly remembered, include the effort by the West to prevent Iran from constructing steel mill factory (Rafi, 2010). The West sometimes, imposed turn-key factories on Iran with outdated and uneconomical technologies like the Arak Aluminum Smelter Factory with the 1945 technology from US Reynolds (MEED, 2001), and some other times sold various high-tech and brand new technologies which were yet to pass quality, efficiency, and safety control at that time. The Ahwaz Steel Mill Factory was a case in point, which included three brand new technologies at the time, i.e., HYL from Mexico, Mildrex from U.S and Purofer from Germany (UN-Minerals Yearbook, 1996).

The general dissatisfaction with this pattern of modernization, alienation from the past glory and perceived unfair and unjust international order had dominated the socio-political discourse in pre-revolutionary Iran ((Boroujerdi, 1996; Ale Ahmad, 2005; Ebrahim, 2008). In fact, there was a clear process of "othering" western societies around the issue of technology. By that, I mean a discourse which situates the Iranian collective identity in the global

arena of the "haves" and "haves not" of technology. Technology, here, is presumed as a tool which either exploits or empowers the nations from a cultural, economic and political perspective. The Western societies as the birth place and the owner of "Technology," allegedly use it to subordinate third world countries, alienating them from their traditional culture and ripping them off when it comes to their natural resources. These are building blocks of a national discourse which views international order as "unjust" sustaining the unfair relationships between the West and Iran. The discourse also views Iranian society as a market that the multinationals dumped their old or risky technologies on and test their new ones at the expenses of the Iranians' health and wealth.

Distanciation Period, Delinkage from World Market: Post-Revolutionary Iran (1978-1990).

In the aftermath of the Islamic revolution (1979), aspirations and emotions, referred to the above, found the opportunity to surface and be somehow institutionalized. Local companies affiliated with big multinational companies in the industrial

and financial sectors were nationalized, the system of protection of trademarks was abandoned and payments for international intellectual property rights were restricted. A generic system for medication prevailed. The religious aspirations embraced the higher education, seeking to fill the gap between the poor and the rich as well as the urban and village dwellers. Agricultural and industrial sectors were mandated to provide self-sufficiency, autarky and eradicating hunger and diseases.

In the industrial sectors, "autarky" or self-reliance (*khodkafaii*) soon became the buzzword for political activism. In order to achieve self-reliance; hundreds of nucleuses (*Haste-haye-khodkafaii*) surfaced in the factories as make-shift R&D centers. Distanciation *par excellence* materialized at the micro level and prevailed; changing the product design and process, or replacing foreign inputs by domestic ones, reverse engineering became common practice at the time of the Iraq-Iran War and the shortage of local currency. Since various needed items in the defense and civil sectors were sanctioned, many small and medium size companies were busy duplicating international brands, while ignoring the intellectual property agreements they made

before the Revolution. Many production units were scaled down and many more of industrial projects were abandoned. Although at the beginning, products were made through a process of trial and error and could not have the same quality as imported products, but with the passage of time, different global standards like ISO's and GMP's were applied, gradually upgrading the qualities of processes and products in manufacturing.

The case of product design of Pardis wine producing plant in Orumieh changed into a grape juice producer stands as an obvious example of destinciation function (changing the consumption pattern). The halt of Bushehr Nuclear Power Plant construction in the aftermath of the revolution was another move inspired by distanciation because, according to the then head of the Iranian Atomic Energy organization, the project was hyper ambitious and unnecessarily costly, which was designed by the West to rip off the Iranian wealth.

The national heroes of this episode were the self designated inventors "*Mokhtare*" and spare part makers "*Ghate-Saz*", who worked in the repair shops or their workshops to build parts of machineries,

"*ghate-e-sazi* in order to create domestic value added. They were from uneducated, lower or middle income social strata whose knowledge was acquired by experience. The petit industry and artisanal workshops viewed the discourse of *total delinkage from the global market* the foundation of their economic power and social status. They saw these activities as enhancers of national self-esteem and consolidator of the material base of resistance discourse against "western imperialism".

While the change in production sector was encouraged by ideological and political activism, the change in the education and research sector required a lengthy, painful process. While the Islamist students in university campuses often functioned as leverage to this end, the resistance by technocrats and intelligentsia in academic milieu against the movement of "distanciation" was a hassle. This politically charged atmosphere ultimately led to an episode of complete perturbation and suspension of academic activities called "cultural revolution".

The revolutionary discourse echoed in the slogans calling for scientific independency and delinkage from the West. Accordingly, *ta'ahhod* (commitment to the

ideology) was viewed as prevailing over Takhassos (expertise). These views, shared by Islamic students and supported by prevailing politicians, and moves stemming from them, frightened academics and often made them leave the country (Milani, 2006).

At the international level, debates and discourse over the Iranian right to enrich uranium is the most serious standoff between Iran and the West, which at the same time relates to the question of the pattern of the consumption: military or civilian. Iran says that it distances itself from military use of the technology for the reason of moral and religious beliefs. It condemns the West for military buildup and threatening others by their nuclear technology. The Iranian argument, in this case too, is further evidence of a distancing mentality without which the Iranian narration cannot be fully understood. The willingness and determination to own and master the full chain of nuclear technology resonate with the people, who still remember the Mussadiq era's discourse of self-reliance in oil industry. The push for developing technology was another characteristic of this narrative, which went hand in hand

with the discourse of autarky and technological independence"¹. The plot which is still unfolding has more or less the same heroes, friends and foes, even martyrs; and in some episodes, it has flamed the strong emotion of technonationalism in the Iranian society.

However, this narrative has some distinct features that distinguish it from the old ones. One of the novelties of the new narrative is the particular kind of narration of selfhood that it has brought forth, maintaining that the national right to technological innovation is the main objective and not the sovereign right over the natural wealth, as it was the case during the Oil Nationalization Movement. The second novelty of the new discourse is the significant role that the new-born scientific community has to play. The term "nokhbegan-e-elmi" or scientific elites, who are the protagonists of this episode, are celebrated as the heroes in the war against the West to acquire technological

1. The relation between the process of independency and the process of enrichment of uranium has always been emphasized in the discourse of Iranian diplomats at the UN. See: Fathi, Nazila (2005)

capability. The production of knowledge 'tolid-e- elm' has become connotative with patriotic action¹.

However, the discourse of technological nationalism suffers, to a degree, from an internal contradiction, since contrary to what nationalism implies, science and technology are inherently international and could not be confined within any political border and geographical frontiers. The local research community, who aims to work on the production pipeline from basic science of the lab to the application stage, has to comply with international standards of safety and security. Its accomplishments then are to be evaluated by international standards and find their way into international journals and patent offices. That leads to a gradual sense of coordination with the world scientific community if not a sense of belonging thereto (Khosrokhavar, 2004a).

Discourse of Appropriation in Public Policy and Feverish Enthusiasm for Science and Technology

Contrary to other revolutions in Asia like those in Russia and China, the Islamic revolution has never tried to mix up the so-called "exact sciences" with political ideology and never brought about any kind of ideologization of the theoretical principles and axiom of objective science known as Lysenkoism, (Bernstein Thomas Hua-Yu Li , 2010). That is why the Iranian revolutionaries did not run into ideological problems when they decided to appropriate western technology. Certainly, the Moslem scientists believe that their science is different from that of the west-inclined (Gharbzadeh) technocratic camp; but the difference is about the social application; as, in their view, science and technology should be at the service of the poor and the oppressed.

The dynamics of political rivalry between technocrats and ideologues who were policy makers are beyond the scope of our study. However, suffice-it to know that gradually after the re-opening of universities following the Cultural Revolution in the 1980s, and especially after the end of the War with Iraq, the

1. The Scientist like Kazemi Ashtyani the founder of the Royan Institute, has always been praised by Iran's Supreme Leader as a Basiji and a national hero.

pessimistic sentiment against western science and technology began to change and a gradual reversal in the public policies towards science and technology started to unfold. The case of *jihad daneshgahi* or academic endeavor is a perfect example of changing the course. It was established as the Council of Moslem Students in the course of the Cultural Revolution. An adamant proponent of the priority of faith (*Ta'ahhod*) over expertise (*Takhassos*), it dramatically transmuted into a giant conglomerate of diverse research institutions with the state of the art technology. The turning point was at the time when, in the aftermath of the reopening of universities in 1982, the *jihad daneshgahi* announced that it would, hereafter, take part in another war for enhancing Iran's independency, and that would be the scientific war (ACECR, 2009). Many of the *jihad daneshgahi* members were the students who interrupted their education temporarily to take part in the Iraq-Iran war and many others volunteered to work in revolutionary institutions. In the post war era they were in their thirties, and had matured in the course of the revolution, war and ideological battles. They returned to school but this

time, they were to build an ambitious scientific community competitive to the western ones (Khosrokhavar et al. 2004 b).

It turned out that the reversal of the policy towards science and technology did not easily produce results. It took nearly 10 years to see the progenies of these radical policy changes in the form of new graduate centers and high technology organizations like Tarbiat Modares University. Among them, new technology related institute like biotechnology and bimolecular research centers commenced to grow with the energy and ideas of young PhD's and MD's who contrary to their previous generation earned their degree without stepping out of the country. In the aftermath of the war, the *Jihad Daneshgahi* often kept its liaisons with the revolutionary institutions and built capacity to organize teams for post-war reconstruction projects. Gradually, they used these capacities to establish their own careers, some in private companies; some other in the public sector.

Making the Scientific Policy based on Elite Consensus over Techno-nationalism Discourse

At the outset of its fourth five-year Economic Development Plan in March

2005, the Expediency Council, sanctioned by the Supreme Leader, issued an overarching policy document called Iran's 20-Year Vision, outlining a road map for the country's economic, political, social and cultural development for the following two decades. The Vision's preamble promised that by 2025, i.e. after the completion of the fourth five-year development plan, Iran would be a fully advanced country, rising to the number-one rank in economic, scientific and technological fields among 28 nations in the Middle East and South-East Asia (*Sanad-e Cheshmandaz*, 2005).

The document called for (a) achieving a fast-paced and sustainable economic growth; (b) creating durable employment opportunities; (c) enhancing factory productivity; (d) active presence in regional and international markets; (e) developing a diverse, knowledge-based economy free of inflation and blessed by food security; and (f) establishing a market environment conducive to domestic and international business entrepreneurship.

In fact, what this key policy document explicitly set out as the national goal was what the previous policy documents and governmental directives had already implied since the end of the Iraq-Iran war

(1988): economic development and social justice. Yet, it distinguishes itself from its antecedents when it comes to indigenous science and technology capability building as the prime mover to achieve the national goals.

Later, while some provisions relating to the national goals set out in the Vision and the 4th five-year plan on economic justice and political development were substantially interpreted differently following the transition from the presidency of Mohammad Khatami to Mahmoud Ahmadinejad's in 2005, the emphasis on the place of such high technologies as nanotechnologies and biotechnologies for the national scientific and technological progress remained intact in State documents and white papers (Gozaresh Moavanat, 2009; Ghanoon, 2007; Road Map 2009, Vision 2005). Exhibiting a virtual consensus across the political spectrum of the Iranian elites, both presidencies share the same visions concerning the significance of the role of science and technology in the national development in spite of their huge disagreements over almost any other policy issue.

The establishment of the Ministry of Science, Research and Technology (MSRT)

in 2004 by Khatami's Cabinet followed by Ahmadinejad setting up the Office of Vice-Presidency for Science and Technology (OVPST) in 2007, mandated to coordinate centers of excellence and different private and public initiatives for technology development.

The actual gross domestic expenditure on R&D has remained minimal, around less than %.1 of the GDP (Iran Statistics Center website), out of which a large share has been allocated to science-driven technologies, like biotechnology and nanotechnologies, that are highly emphasized by all policy documents and the 4th plan and accorded top priority in the agenda of both MSRT and, OVPST (Ghazinoory et al, 2009).

The consequence of these unbalanced policies and plans along with a variety of positive and negative externalities, like growing abundance in oil revenue available to the government and the lack of international collaboration due to the sanctions, have rendered the Iranian national innovation system asymmetrical, featuring the following:

a) Iran has the highest tertiary gross enrollment rate in the region (Brundenious, 2009). The total number of college students

has grown 7 times during the last 15 years (1995-2009), amounting to more than 3.7 million; representing a third of the country's 18 to 24 years old (MOST website), equal to Singapore's population. The number of students in medical school has reached 150,000 and in science and engineering around 1,200,000 (IRPHE website).

b) According to one source, Iran has experienced the fastest rate of growth in the world, including the BRIC countries, in terms of science production (Science Metrix, 2010: 5). In the last 25 years, Iran's productivity in science and technology in terms of scientific papers has increased dramatically and doubled its output in the first two five-year development plans and has multiplied by 2.8 from the second to the third five-year plan and continues to grow (Osareh, and Wilson 2002).

c) According to the January 2009 update of Essential Science Indicators (ESI), Iran has achieved Rising Star status in the three fields of clinical medicine, microbiology and biology, and biochemistry. Although the facts and figures show that the country has a long way to go to catch up with the emerging economies like Turkey, India and China.

d) As to the industrial sector, according to statistical studies, Iran is positioned as a late comer with a moderate rate of growth (Archibugi, Coco, 2004: 638). However, this overall ranking does not reveal the lopsided pattern of national innovation system in which capabilities for science production is much stronger than those for technology production. According to a recent study by the Iranian Association for Technology Management, Iran's technological indicators rank 20th among 23 countries with the same sized economy. In a more detailed description, it suggests a low ranking for infrastructure capabilities (20th out of 23), a better than median ranking in the category of producing knowledge prior to the commercialization phase (16 among 23) and the lowest when it comes to the indicators of capabilities in the area of investment and commercialization of technology (23rd out of 23), (IRAMOT website).

While academia and the scientific community have been able to come up with a growth rate corresponding to the objectives of Iran's 20-Year Vision and its related development plans, the above mentioned figures illustrate the fact that their technological counterparts and

industrial networks failed to deliver a similar result. The dichotomy between science and technology production might reveal some deeper rooted cultural and economic institutions, which do not support innovative thinking especially in the realm of profit-seeking activities (Khosrokavar, Ghaneirad and Toloo, 2007). The historical-cultural preference of theoretical and academic endeavors over more hands-on and practical efforts was later consolidated with modern factors such as the recycling of petrodollars and the prevalence of Dutch disease, which makes the national currency overvalued and domestic products more expensive than those imported (Michaels, 2010, Everhart, 2010). That is why the broker agencies between academia and industries like venture capitalists, the commercialization agents and technology transfer offices are virtually absent in the Iranian innovation system.

It is a stylized fact that the industrial community and productive system are more vulnerable than the scientific community, which is publicly funded, to the infrastructural shortcomings and market failures, e.g. overly state-run market economy, distortions of real prices and, most importantly, economic sanctions and

instability in interactions with the outside world. In fact, a sense of insecurity in relation with the outside world restricts Iranian entrepreneurs in their efforts to count on an open-door strategy for industrial development and few firms, which have mustered the will and resources to endure against all odds, might as well apply an autonomous growth strategy in a globalized world in order to survive the international economic sanctions.

The unevenness between the science and technology production has shaped the national system of innovation, which is lopsided to the point that while the talk about the renaissance of the scientific community is prevalent, the industrial sector is experiencing a negligible and sometimes negative rate of growth.

Conclusion

In this paper, a discursive relationship between the society and the technology was presumed, by making an analogy between the technology and the text in the Ricoeurian theory of hermeneutical interpretation. The main question here was how this relationship turns from a public policy based on a discourse of suspicion into a discourse of faith in some countries

like Iran. To answer this question, this paper reviewed the historical context of post-revolutionary Iran; and according to the Ricoeurian two-staged model of theory of interpretation, this paper distinguished two different episodes in the aftermath of the Islamic Revolution in Iran: the phase of distancing (1980-1990) and the phase of appropriation (1990-present). The paper established that each specific dominant discourse has its own material base addressing the relation of the society to technology. As a result of this dialectical relationship between the two episodes, a new meaning (surplus meaning) and a new identity has taken shape, which promotes knowledge intensive technological development in Iran in the prestigious sectors of new technology like nano-technology, bio-technology, cognitive sciences and stem cell research and therapy. It also focuses on the dual use technologies like space and missile technology. However, contrary to the other contemporary cases of techno-nationalism, the outcome of the science and technology development in the process of wealth creation, i.e. its impact on productivity, revenue generation and overall social welfare is still unclear. Due to the

intervention of other factors like the international economic sanctions and global financial crisis, and the lack of the reliable statistics, it is very hard to estimate the contribution of science and technology in the main economic indicators like Iranian gross domestic product (GDP).

Contrarily, the sociological impact of this pattern of development can be clearly pinpointed in the national media and public speeches: an agile techno-nationalism which motivates the elites to develop new bases for national self-esteem. By appropriating modern technologies, a modern Iranian nationalism pivoting around technology development is blooming. It entails a new collective self-image, a new national narrative which defines selfhood (Iranians) versus otherness (Western countries) within which the innovative citizen is celebrated.

References

- [1] Farahmand, Mehdad (2011), "Alghonoshi talking about the success and failures of I.R.I" interview with Rashed Alghonoshi, BBC Persian site Oct.24.
- [2] Science Matrix, (2010), "30 years in science, secular movements in knowledge creation". Retrieved from <http://www.Science-Matrix.com/30years-papers/pdf>
- [3] McKenzie Debora, (2011), "Iran showing fastest scientific growth of any country – science-in-society – 18 February 2010".. <http://www.newscientist.com/article/dn18546-iran-showing-fastest-scientific-growth-of-any-country.html>.
- [4] Coghlan Andy, (2011), "Iran is top of the world in science growth" - science-in-society - 28 ... www.newscientist.com/.../dn20291-iran-is-top-of-the-world-in-scien.
- [5] Van Noorden, R., (2011), "365 days: 2011 in review". Nature 480, 426-429.<http://www.nature.com/news/365-days-2011-in-review-1.9684>
- [6] Marcel Valerie, (2001), "The constructivist Debate; Bringing Hermeneutics" (properly) in, paper presented at the 2001 ISA conference, 21 Feb2001-panel WD18 available. <http://isanet.ccit.arizona.edu/archive/isa01.pdf>
- [7] Wiebe E., T. Bijker; T.P. Hughes; T. Pinch, (20012), The Social Construction of Technological Systems: New Direction in Sociology and History of Technology, MIT

- [8] Latour B., (2007), *Reassembling the Social : an Introduction to Actor-Network Theory*, OPU Oxford.
- [9] Mayntz, Renate and T.P. Hughes, (2008), *The Development of Large Technical System*, Lightning Source Incorporated.
- [10] Douglas D., (2012), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, MIT press, introduction p.XVI.
- [11] Pyka A., Maria da Graça Derengowski F., (2011), *Catching Up, Spillovers and Innovation Networks in a Schumpeterian Perspective*, Springer.
- [12] Chung Anh Tran, (2011), *Role and Dynamics of "Late-Comers" in the Global Technology market*, KIT Scientific Publishing.
- [13] Chowdhury Anis, (1996), *The Newly Industrializing Economies of East Asia*, London: Routledge.
- [14] Reddy Prasada, (2011), *Global Innovation in Emerging Economies*, Taylor and Francis.
- [15] Pirie Iain (2007), *The Korean Developmental State*, London: Routledge.
- [16] Ostry Sylvia, Richard R.Nelson, (1995), *Techno-Nationalism and Techno-Globalism: Conflict and Cooperation*, Brookings Institute.
- [17] Sandra Montresor, (2001), *Techno-Globalism Technonationalism and Technological Systems: Organizing the Evidence*; *Technovation* 21, 2001, PP 399-412.
- [18] Edgerton, David E., (2007), "The Contradiction of Techno-nationalism and Techno-globalism", <http://csde.washington.edu/~scurrin/files/readings/SIS511/EdgertonNewGlobalStudies.pdf>
- [19] Felker, Greg, (2009), *The political economy of Southeast Asia's techno-glocalism*, *Cambridge Review of International Affairs*, Vol. 22, Number 3, September 2009 , pp. 469-491(23).
- [20] Ann Clunan, (2009), *The Social Construction of Russia's Resurgence: Aspirations, Identity, and Security Interests*, JHU Press, Apr 24.
- [21] Vioda Amy, (2008), *Exploring a Technological Hermeneutic: Understanding the Interpretation of Computer-mediated Messaging Systems*, ProQuest.
- [22] Galgan G., (1993), *Interpreting the Present: Six Philosophical Essays, Epistemology of technology: technology as a text in Gerald J. interpreting the present: six philosophical essays*. University Press

- of America.
- [23] Paul Ricoeur (1973), The model of the text and, meaningful action considered as text, From Text to Action, Northwestern University Press.
- [24] Ricoeur Paul (1976), Theory of interpretation and surplus of meaning, Christian University of Chicago [25] Miremadi, T. (2010), Stem Cell Research and Technology in Iran—Window of Opportunity in the Midst of International tension, Review of Policy Research, Volume 27, Issue 6, pages 699–719, November 2010.
- [26] Miremadi, T., GH Salekdeh, N. Aghdami, M. Gharanfoli, M. Asei, A.Kouhkan and Hossein Baharvand (2012), Stem Cell Research and Therapy, Pioneering in the Islamic World, Stem Cells Development:120720172436003.
- [27] Shumpeter Joseph (2009), Can Capitalism Survive? Creative Destruction and the Future of the Global Economy, HarperCollins,
- [28] Lundvall BA., (2010), National Systems of Innovation: Toward a Theory of Innovation and Interactive Learning, Anthem Press.
- [29] Freeman Chris and Luc Soete (2012), The Economics of Industrial Innovation, London: Routeledge.
- [30] Lall Sanya (2001), Competitiveness, Technology and Skills, London: Edward Elgar.
- [31] Samir Amin (2011), Maldevelopment , Anatomy of a Global Failure, Cape Town: Pambazuka Press.
- [32] Richard Kearney (2004), On Paul Ricoeur: The Owl of Minerva (Transcending Boundaries in Philosophy and Theology), 117.
- [33] Rafi Masoud (2010) The story of Iran first steel plant , Oral history of Iran , Iranian Oral History Collection, Harvard. <http://www.humanities.uci.edu/iraniandocuments/articles/Rafi.steel.industry.html> retrieved on April, 16-2012.
- [34] MEED (2001): Economic East Digest Limited, Volume 45, issues 40-52.
- [35] UN-Bureau of Mines (1996), Minerals Yearbook: Vol. 3.
- [36] Rahnama, Saeed, (1995), Continuity and Change in the Industrial Policy in Sohrab Behdad (1995) Iran after revolution, I.B. Tauris.
- [37] Nasiri Moghadam, (2005) Iran and Its Eastern Neighbors in Adle Shahryar , Chahryar Adle, Madhavan K.. Palat, Anara Tabyshalieva (2005), History of Civilization of Central Asia, Towards Contemporary Period Paris: UNESCO and Mc Milan.
- [38] Milani, Abbas, (2006), A Tale of two cities, a Persian Memoire. Mage

- Publishing.
- [39] Farhad Khosrokhavar, S. Etemad, M. Mehrabi (2004), Report on science in post-revolutionary Iran—Part I: emergence of a scientific community? *Critical Middle Eastern Studies*, Vol. 13, Issue 2, 2004.
- [40] Thomas Hua-Yu Li, (2010), *China Learns from the Soviet Union, 1949-Present* (Harvard Cold War Studies Book Series, Lexington Book, January 2010).
- [41] ACECR (2009) "Jihad Daneshgahi from revolutionary organization to a research organization" in the website of ACECR available on http://www.acecr.ac.ir/frmArticle_fa-IR.aspx?ID=461596&CategoryID=25 retrieved on August, 31-2012.
- [42] Khosrokhavar Farhad, Shapur Etemad and Masoud Mehrabi (2004b), Report on Science in post -revolutionary Iran-Part II: The Scientific Community's Problems of Identity. In *Critique: Critical Middle Eastern Fall 2004*, Vol.13 Issue 3 pp363-382.
- [43] Azimi, N. A., & Barkhordari, S. (2009), Study on R&D investment in Iran, *Journal of Management of Technology Development*, 1(1), 90–101.
- [44] Harding Sandra (2011), *The Postcolonial Science and Technology Studies Reader*, Duke University Press.
- [45] Fathi, Nazila (2005), "Iran Hints Talks on Ending Its Nuclear Program Are Near Collapse", in *NY Times*, April 29, 2005.
- [46] Organization of Plan and Budget (2005). *The Law of 4th Plan of Economic, Social and Cultural Development* (Ghanoon e Barnameh Chaharom Tose Eghtesadi, Ejtami va farhangi Jomhori Eslami) 2005-2006. Tehran: Markaz Madarek Elmi.
- [47] Ghazinoury, S., Mahdieh, Farazkish (2010), *A Model of Technology Strategy Development for Iranian Nano-Composite Companies, Technological and Economic Development of Economy*, Volume Issue 1, 2010, pp.. 25 – 4.
- [48] Brundenius, C., Lundvall, B.-A., & Sutz, J. (2009). The role of universities in innovation systems in developing countries: Developmental university systems—empirical, analytical and normative perspectives. In B.-A. Lundvall & C. Chaminade (Eds.), *Handbook of innovation systems and developing countries: Building domestic capabilities in a global context* (pp. 312–336). London: Edward Elgar.
- [49] Osareh Farideh and Wilson (2002), *Collaboration in Iranian scientific publications*, Libri, 2002, Vol. 52, pp. 88-98.
- [50] Khosrokhavar Farhad, M.A., Ghanei Rad, M. Toloo (2007), *Institutional Problems of the Emerging Scientific Community in Iran, Science , Technology and Society* , July 2007, vol. 12 no. 2. pp. 171-200.

شک یا یقین: ریشه‌های فرهنگی سیاستگذاری عمومی در بخش علم و فناوری در ایران

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در سال‌های اخیر، منابع متعددی در مورد پیشرفت علوم و فناوری در ایران منتشر شده است. با فرض اینکه فناوری یک "برساخت اجتماعی" محسوب می‌شود، این مقاله کوشش می‌کند در پرتوی نظریه تفسیر پل ریکور، نشان دهد که رابطه گفتمانی جامعه ایران با فناوری غرب را می‌توان به رابطه متن با خواننده در "گفتمان یقین" ریکور مشابه دانست. ثانیاً، این مقاله می‌کوشد روشن سازد که این مرحله در بستر گفتمانی پیشین ریشه دارد که می‌توان آنرا "گفتمان شک" نامید.

در همین راستا، مقاله نخست بر اساس نظریه تفسیر پل ریکور یک مدل مفهومی بنا می‌سازد که در آن بر حسب تمثیل، فناوری به متن و کاربر فناوری به خواننده متن تشبیه شده است سپس در یک مطالعه تاریخی توضیح می‌دهد که در دوران پس از انقلاب، این رابطه دوتایی (فناوری و کاربر آن) دارای دو مرحله با ماهیت متفاوت بوده است: مرحله فاصله گذاری از ۱۳۵۷ تا ۱۳۶۸ و مرحله فاصله برداری از ۱۳۶۸ تاکنون. مقاله با این نتیجه‌گیری پایان می‌گیرد که رشد کنونی تولیدات علمی به مثابه پایه‌های مادی، سیاست‌گذاری عمومی با محوریت ملیت خواهی فناورانه مبتنی بر "گفتمان یقین" عمل می‌کند و این گفتمان نیز به نوبه خود، در خدمت فرایند هویت سازی اجتماعی است که به قصد ایجاد حس عزت و احترام به هویت ملی ایجاد شده است.

واژگان کلیدی: هرمنوتیک شک، هرمنوتیک یقین، متن و خواننده، ملیت خواهی فناورانه، سیاست‌گذاری عمومی.

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