THE ROLE OF DIASPORA IN DEVELOPING IRANIAN SOFTWARE INDUSTRY

Master Project Thesis

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DEDICATION

Hereby I dedicate this thesis to my beloved advisor, Bahman Samandari who sacrificed his sweet life to open the doors of higher education for the Baha'i youth in Iran. May his kind, warm and sacrificing spirit inspire us all.

Oslo, 18th April 2006

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Chapter 1: Introduction

During the last decade a few countries like India, Ireland, Israel and Malaysia have transformed the infrastructure of their economies to integrate IT infrastructures with a profound recognition of the importance of the IT industry and have gained revolutionary fast progress in the economic development of their countries[1]. Thus software outsourcing has become a very good source of income for these countries as well as improving their national standards. Software outsourcing is also a good method for more profitable production for first world countries.

Iran is also among the developing countries that both needs more income and has good potential to produce and export software [2]; because during recent years the development of university courses and the increase of IT students has made a proper background for the start-up of an IT industry and the application of IT in Iran[1]. But this country has not as yet made noticeable success in this field.

Iran also has a great need for software to be used inside the country. Although there are no accurate statistics about IT factors in Iran, very rough estimations show that Iran needs about 10 milliard US Dollars of software annually, only to meet its internal needs [3][1]. This estimate can be confirmed by the fact that the country lacks almost all kinds of IT infrastructures. There is no nationwide valid electronic money in Iran yet and banking services and systems are comparable with that of 50 years ago in developed countries. Thus the volume of internet marketing is almost absolute zero. Information systems in both state and private sectors are either nonexistent or very primitive and existent ones don't comply with each other. The National registry system is not complete and operational yet, and the plan changes totally every few years. The TAKFA plan has not been successful and the "electronic government" that was a part of that plan, is only a new name that has made relevant procedures longer and more expensive compared with the former manual system [4]. It needs a separate chapter for itself, if we want to continue this list.

So, according to Iran's unexploited capacity for producing and exporting software, as well as importing and exporting IT products, it is interesting for many (see subsections 1.2.3 and 1.2.4 for a list of them) to research about the software and IT industry in Iran, both for export purposes and for internal IT development.

On the other hand, during the last 27 years (after the Islamic revolution) many Iranians have emigrated or escaped from Iran. Most of these people have been from the educated and/or wealthy classes of the community. So Iran has lost a very large group of its human recourses which could have had a key role in its IT and software industry, both in its technical and economical aspects.

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[1] Also look at case 5 in chapter 7, my interview with Dr. Zarei. He confirms these figures too.

No doubt, according to the abovementioned great capacity and potentials, and also because of the fast progress of technology and the IT revolution in the world, sooner or later, the Iranian software industry has to develop drastically. But before this positive change, all foundations need to be excavated, prepared and built.

According to the software export success model (which will be discussed in chapter 4, theory overview), these foundations and infrastructures can be grouped in three levels:

- National software vision, strategy that first of all includes a government determined on progress (and not restitution, recession and reversal), and a national will to reach achievable preset goals that must be organized in the frame of five year plans.

- National software-related infrastructure that includes powerful industrial and technological infrastructures such as fast, cheap and reliable internet networking, hi-tech servers and an industrially-oriented educational system; an up-to-date and modern banking and financial system; and above all, protective laws.

- National software industry that is made up of an expert work force and efficient mangers, which must be protected by a reliable financial system.

Many groups/classes of technocrats and experts are involved in building and maintaining these infrastructures and the other levels that are explained in chapter 4. State politicians, university professors, industrial, financial and IT managers, software experts and IT/IS researchers can all be mentioned within those classes.

As many members of all these classes have escaped/immigrated from Iran to developed countries during the last three decades, the Iranian diasporas or in other words expatriates, assume many important and vital roles in the development and enfoldment of Iran's software industry. This research is intended to investigate different roles that Iranian diasporas can play in this relation.

1.1 Research motivation

Escaping Iranians have gone to all 5 continents and 200 countries of the world. The number of the escapees and emigrants is estimated between 3 and 6 million, which in other words is about 5% to 10% of the 65 million Iranian populations.

Many of these people visit their family and homeland annually while many others cannot enter Iran or are at least afraid of doing so. But wherever they live, Iranians still love their homeland and are one of the most successful and educated minority groups [5].

This large group of Diaspora that are scattered in almost all countries can play a major role as connectors between Iranian and international software companies (provided that other problems can be overcome or at least reduced). These people can serve this goal either in the very country of their permanent residence while working in the outsourcer company, or by coming back to Iran to work in the outsourced side, or as many of them wish, keep both sides simultaneously. In any of these 3 cases, they can, and must, also work as the lubricant to reduce the existing frictions between

Iranians and the foreign world via lobbying, transferring new methods and technologies to Iran, training internal staff, and by providing many other services some of which I attempt to mention and describe as a part of this research. A detailed discussion of different services that this group can give to Iran, comes in the very last chapter, chapter 7: Discussion and Conclusion.

In any case, almost no other country has such an opportunity to have such a big group of potential connectors and specialists all around the world (it is estimated that only India with almost 16 times as great a population as Iran, and China with almost 20 times more, have more or comparable numbers of diasporas outside their countries . So, Iran has one of the highest percentages of educated and expert Diaspora compared to the population. Afghanistan, for example, has a very high percentage of escapees too, but unlike Iranians, the majority of Afghans are poor and low-educated farmers who have no specialty. Most of them live in Iran and Pakistan and work as manual workers.

In the following subsections I will explain the reasons for which I have chosen this particular topic for this research.

1.1.1 Significance of the Problem

Here I describe the significance of this topic from different points of view. We can distinguish three distinctive factors in this topic: Iran, Iranian diasporas, and software industry. These factors are discussed in more details as following:

- **Why Iran?**

Iran is one of the biggest countries in the Middle East region and it has all needed characteristics to become the leading industrial power in the region. Characteristics such as the size of the country land, enormous young and educated generations, bountiful natural resources, and above all strategic location not only in the region, but also in the world.

The last abovementioned characteristic enables Iran to become the IT and internet hub of the region. Reza Parsa has discussed the problems in this way and has recommended a few points in order to achieve this goal [6]. Figure 1.1 illustrates this possibility.

As a result of the chaotic political history of Iran during the last centuries, and also because of the endless reservoirs of oil and gas which have given huge incomes to the governments, most of these potentials and resources are not exploited yet. Yet, some evidences[2] show that a great reform is about to take place in this country and put its potentials and non-oil resources to work. One of these possibilities is software export which is most relevant to the topic of this research and we follow it in the next subsection.

But, before that I have to add that as I am Iranian myself, it was most desirable for me to do my work on Iran; particularly because of lack of research in this area about

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[2] Look at foot note 6 in page 7 please.

Iran. So I decided to work on Nicholson and Sahay's article on the Iranian software industry.
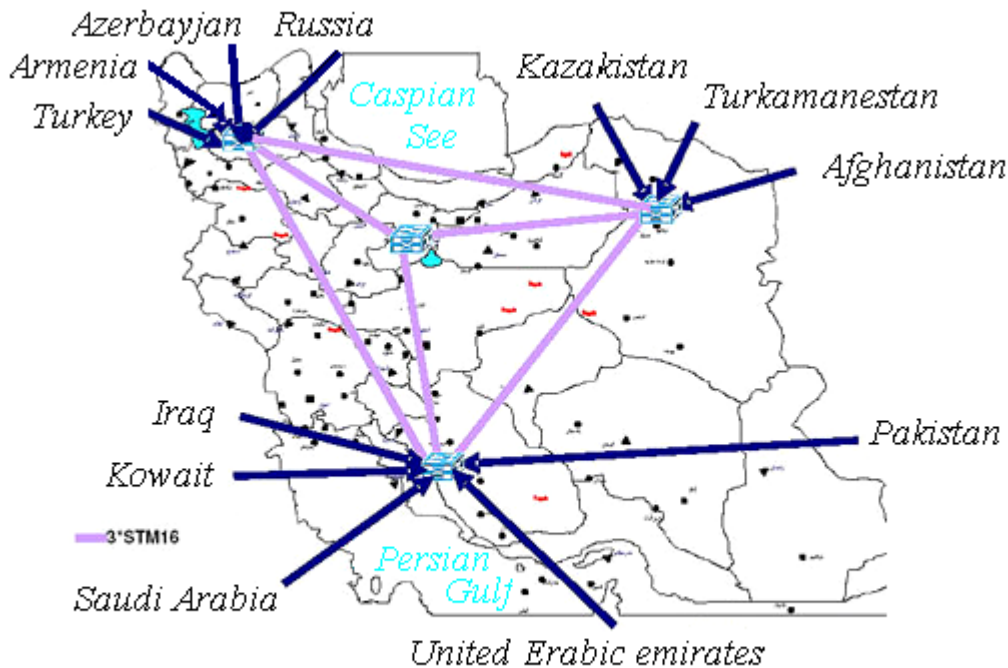
Figure 1.1: Iran as the Internet Hub of the Region

- **Why software industry?**

As Nicholson and Sahay remind us, there are two major challenges facing the Iranian software industry:

"*How can Iran adequately meet the domestic demand for software applications of both the government and private sector, and at the same time develop capability of the Iranian software industry to become globally competitive?*" [3]

The need for internally used software is very high because, as we will see later in this thesis, Iran's information infrastructures are very weak and in fact compared with today's technology which is currently exploited in first world countries, it is almost zero; even compared to other developing countries like Turkey and Egypt, Iran's IT infrastructure is very primary. So it needs milliards of dollars of software (as mentioned earlier, about 10 milliard US dollars a year) to fill the ever expanding vacuum of IT and computerized systems in the country that once was a pioneer of IT in the region during 70s.

In 2002, the Iranian government proposed a program for the "Development and Application of Information and Data Technology in Iran" (TAKFA). The purpose of this program is to clarify the development of IT policies in Iran [7]. However, the budget devoted to this program is insufficient, and, worst of all, most of it is spent to buy hardware without developing appropriate software systems to support the automation of the system [2]. The reason has been the numerous (more than 20) responsible organizations for control of IT in Iran [1] [8], along with wide spread corruption in the country [4] that has prohibited expected success and progress in this plan.

Therefore while the government has to improve the budget plans and apply more control over distribution of contracts and budgets; they should put more emphasis on software instead of hardware. As Iran's language is exclusive to the country and lots of its young educated people are unemployed, the best solution is to produce the required software inside the country. Moreover, while there is always a shortage of budget in Iran, the expenses of producing software in the country are by far lower than buying it from foreigner companies (even sometimes when the required system is already on the shelf in developed countries, it is still more economical to produce and distribute the internal version).

In her article, Neda Dehghani points out that it is now realized that software production can save Iran's IT market and should be set as a basic goal. So the government has recently passed a resolution to support Iranian software with copyright legislation. Currently, copyright law in Iran is very weak and primitive, and doesn't support foreigner products at all [2]. It is possible to buy any kind of unlocked software (and copied movies) just for the price of a row disk without any legal prohibition; any visitor can realize this fact during a very short tour in Tehran.

Therefore, the new legislation will encourage software producers to increase their production and implement larger projects as they are hopeful of the return of their money and don't fear that the users use illegal copies of their software freely.

Dehghani also reminds us that while Iranians are happy to have sold 11 million dollars worth of software to foreigners during the Iranian year 1382 (2001, 2002), India has exported 6.5 billion dollars worth of software and hardware in only 6 first months of 2002, and it has a growth at a rate of 35% a year to reach to 80 milliard Dollars until 2008; due to correct and efficient programs and policies [2]. This shows how Iranians need to change their methods of management and policies in order to strengthen their software production and exportation foundations.

So we see that in India, as a pattern of progress for the whole world, especially in software, the annual income generated through software production and export is more than all of Iran's non-petroleum exports; and is estimated to become even more than the income of selling crude oil in Iran in a couple of years [2].

It is obvious that any growth needs proper conditions, which means that IT foundations and infrastructures need to be built along with correct economic and political rules and policies in order to support software production (and exportation). As currently IT infrastructures in Iran are very primitive and insufficient, it is very important for the government to obtain the best possible policy to construct a proper basis and background for the IT and software industry on which other companies and private section can begin working; both to answer internal increasing needs, and to get a bigger share of the international export market. But first, those good particular policies must be developed in a proper atmosphere related to the overall national and foreign policy, from which Iran is very far. As we will see in chapter 4, in a successful software export model, national software vision and strategy is the most fundamental level.

Once proper foundations are made and prepared, different companies can act efficiently in Iran's IT and software market. Iranian expatriates can play their role in both phases which will be discussed in the last two chapters, 6 and 7.

The other very important aspect of the software industry for Iran is the potential economic value of its export. It has two major benefits for Iranians: while any kind of production can reduce the great number of jobless (mostly young) army[3], any kind of export can increase the foreign exchange income of the country. Despite the abundant reserves of oil and natural gas, foreign exchange has always been a major problem for Iranians during the last 27 years[4].

But, there are many big problems and difficulties for Iranian companies to produce software. One of the most important of all is the inability of Iranian companies to export it to the western companies which are generally located in the United States. As Iran is currently under the commercial embargo of the US, American companies can not legally outsource Iranian companies. Those few small companies, who do it illegally, have major problems to transfer the money to their Iranian contractors. They usually use third companies in East Europe or Dubai or places like that, which imposes great losses and limitations to both ends. Totally the whole procedure is so difficult and insufficient that widespread contraction and interchange between Iranian software producers and IT service providers on one hand, and foreigner outsourcer companies on the other hand is currently nothing more than a nice dream.

One of the other problems is lack of human resources at high levels and particularly project management [3]. The other one is deep corruption in governmental companies, which makes them more tendentious to make contracts with foreigner partners as they pay more percentage (bribe). A more detailed discussion on this comes in chapter 5, literature overview.

- **Why diaspora?**

As the methods and patterns of administration and management in Iran have shown themselves to be wrong and very far from efficient, according to the Software Export Success Model (explained a little bit later) the first step to increase the software production in this country must be to establish a correct policy[5] in IT affairs; then building infrastructures and also attracting international trust and cooperation as well as reduce the high rate of brain drain. But as this area is too vast, I had to limit the problem and chose a smaller part in order to focus on it. The following points have been my main reasons to choose Diasporas role as the focus point of my research:

- The highest class of the Iranian community, meaning the educated people, high rank managers, owners of big capitals, and in a word most open-minded Iranians have continuously escaped the country after the Islamic revolution in 1979

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[3] As the joblessness is estimated to be more than 20% and this big group has many social and economical problems, and is able to cause political problems too, the irony of 'army' is not irrelevant.

[4] In order to show the importance of this problem, section 3.1 of chapter 3, "the current situation" is dedicated to 'economy'.

[5] The Webster dictionary mentions few meanings for the word 'policy', including:
1. Civil polity.
2. The settled method by which the government and affairs of a nation are, or may be, administered; a system of public or official administration, as designed to promote the external or internal prosperity of a state.
3. The method by which any institution is administered; system of management; course.

I have used this word here to convey meanings number 2 and 3.

(Extracted form: http://www.webster-dictionary.org/definition/policy)

and resided in all other parts of the world. As human resources have the first priority in building any kind of institution in all human civilizations, it is rational to begin from the Diasporas.

- As I am now studying abroad, and I decide to go back home after finishing this project, the first question in my mind, and also for all others who know me, is this: "What will you be able to do after you go back to Iran?" They have in fact in their mind, and more intimate friends say: "Don't go back and stay here, are you mad? You can do NOTHING at all there! Is there any job for you there, do you think?" But for me it means: what should I do after returning home? Is there any service that I can offer to my country on my return? So the result of this project is in fact the answer to the question of my own life.

- As in today's international village, nobody can live isolated and manage all his problems alone, all countries need the other's help to improve their current situation, keep on going forward and even to survive. No doubt, the worldwide Iranian Diasporas are the best answer to this question that "Who can help Iranians to improve their software industry?"

- When I find a good answer to this question –the topic of this thesis- I can share it with millions of other Iranians who have the same question in their minds, particularly those who believe we can do nothing and those who ask "What can we do now?".

The other important factor in choosing this topic is time. Iran has a very unstable economic and political situation today. The recent presidential election and what has happened after that has worsened the condition to a high extent instead of making any improvements. The free descent that Iran's economy was experiencing (despite the statistics that shows growth) has accelerated: the stock has fallen down drastically, the exit of big amounts of money has increased, and the international relations are in a serious crisis and much more. According to the limitations of this research it is impossible to dedicate much space to this problem, as a new crisis is showing up every day. Yet a more detailed overview of such problems is coming in chapter 2, 'current situation'.

Despite the disastrous current conditions, a total and fundamental change in the political system is expected in the near future. It would be rational for us to hope that the country will enter an era of reconstruction and rebuilding during which IT will have a very important role.

On the other hand, some analysts compare Iran's present state with that of the US in the beginning of eighties, when IT was beginning to grow in the country and internet boom happened in the next decade[6], or Norway in 90's when some people were going to become 'IT millionaires'. Although in United States and in Norway, governments protected national benefits, and software-related infrastructures were already present or were being built rapidly (the first two levels in software export success model), and in Iran both are absent; yet according to the abovementioned evidences, this comparison is not totally irrelevant.

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[6] See my interview with Mr. S. in case8 of chapter 7

Anyhow, the abovementioned analysts believe that any active computer company in Iran can gain huge success and money in the coming decades and that it would be very beneficial for anyone who invests in the IT sector in this market. Yet in order to bring this dream into reality the first step is to plan a good strategy and implement it correctly (the very first level in the software export success model). Although our focus in this paper will be only on the role of Diaspora in the future of Iran's IT industry, we are obliged to cover other aspects shortly, too.

The witness and proof for this prophecy about the forthcoming boom of IT in Iran, in addition to those mentioned in footnote 6, is the rush towards the use of computers in all possible areas (home, education, trade, industry, etc.) inside the country, along with the urgent need of all sectors to mechanize and automate their old and inefficient systems. What strengthen this idea, are the multi million Iranian communities in the first world countries who are highly educated and have control over an estimated 1000 billion dollars capital [5]. A very big part of this worldwide spread, rich and well-educated Diaspora wish to help rebuild their home country and even go back and live there; others wish to do anything they can, although they may never be able to return to their birth place.

Good, modern and efficient management can be the biggest service that the emigrant Iranians can give to their homeland if they come back to Iran. But the bitter fact is that the power in Iran is in the hands of mafia groups and they have shuffled the key jobs between a few thousand of their own members during the last 27 years [9]. So, non-corrupted managers who don't cooperate with the mafia, even with highest specialty and best experience and brightest background, eventually can do nothing even if they leave their golden position and luxurious life in the West and come back to their homeland; while most of them claim that they wish to do so one day.

In their article "Building Iran's software industry", Nicholson and Sahay point out that Iran has two major problems that have prevented it from acquiring its proper position in the international market. The first big problem is Iran's weak and wrong foreign policy that has made the USA put an embargo on the country, which again confirms mismanagement. Such policies are going to make the country internationally boycotted too, because of the issue of developing nuclear industries and involvement in international terrorism. Thus, any lobbying role that even the most powerful and well-known Iranian-Americans can play between the two countries is automatically paralyzed. This also means that no patriot Iranian volunteers lobby for the Islamic regime. Once again we see that in the absence of the first level of the software export success model (national software vision/strategy), building the higher levels (international linkage and trust in this paragraph) is impossible; despite the powerful and extreme potential forces.

Again we see that Iran needs a 180 degree turn in both its foreign and internal policies, in order to let its adequate, competent and deft diasporas come back to Iran and take over control of affairs, or give their services to their homeland from their present residences. Iranian specialists occupy some of the highest positions in the US, Europe and all other parts of the world.

Nicholson and Sahay also mention that: "*Even though technical skills are high, the weakness of project management skills has led to the failure of large projects*". Thus the other important problem is the lack of experienced project management in the

country, which results in lack of success in all major projects; as mentioned above [3] . I have discussed the services that Iranian expatriate experts can give in this regard in chapters 7 and 8.

Finally, the last chapter, chapter 8, discusses several different ways in which the Iranian diasporas can serve the above mentioned goals; i.e.:

1. Transfer the knowledge and new technologies to promote the scientific ability of Iranian IT society, and even laws needed for such activities.
2. Preparing money recourses and assets to be capitalized in IT industry in Iran.
3. Compensating the lack of human recourses and specialized staff which is one of the country's most important problems, due to the high rate of brain drain.
4. Importing the culture of using IT based services in daily affairs, to Iran.
5. Importing the culture of obeying the rules from western societies in which people respect the law, and fight corruption and illegal ways of doing all kinds of activities.
6. Reform in the educational system of IT and software courses according to the new goal oriented educational systems in developed countries.
7. Implementing strategic research in IT-related areas.
8. Cooperate to present Iranian software industry in the international markets through software fairs, representing Iranian companies and other methods.
9. Finding foreigner markets for Iranian products and services.
10. Establishing international linkage and trust between Iranians and foreigners
11. Teaching new management methods to the workforce.

1.2 Benefits of this research and research problem

In this section I will try to introduce the target groups of this thesis. In this relation, first of all I have to limit the wide scope of the word 'diaspora', as I only want to point to a particular group of people when I mention "the Iranian diaspora". Then I clarify the problem that I am going to solve through this research; and according to that I explain the expected benefits of it. Finally the expected contributions of this research will be introduced.

1.2.1 Diaspora's scope

Diaspora, which according to the Webster's online dictionary means "*A historical dispersion of a group of people deriving from similar origins*", has a very wide meaning that includes everybody who comes from the same origin [10][7]. This group

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[7] The same dictionary adds:

of people generally has common interests and ties. Halleh Ghorashi quotes this sentence from Clifford: *"Diasporist discourses reflect the sense of an ongoing transnational network that includes the homeland, not as something simply left behind, but as place of attachment in a contrapuntal modernity."* [11][8]

But obviously our work is addressing a limited group of Iranian emigrants who have been born in Iran, or at their present residence from Iranian parents; and have the following characteristics:

- Live and work in developed countries.
- Either work in the field of IT and software industry, or have a kind of commercial or cultural activity that can be applied in relation to supporting software production and IT industry or promoting use of IT in daily life.
- Having high education is not a necessity but is a positive point and most members of our target group have this condition.

1.2.2 Research Problem

Normally all research topics must cast a question which is to be answered as a result of the research. Although this thesis' topic is not in the form of a question, we can consider that it is in fact a short form of this question: "what are the different roles that the Iranian diaspora can play in the development of the IT and software industry in Iran?"

In this regard, in the last chapter (chapter 7, conclusion) we will discuss several answers that this research has found as possible answers to the abovementioned question. I have pointed to them earlier at the end of section 1.1; the next subsection contains also few questions that this thesis is trying to find proper answers to.

1.2.3 Benefits of this research

Currently, most Iranians are waiting for something positive to happen, and obviously they expect somebody else to make that thing happen. Those who are residing outside the country, always say that if 'That' happens, we will go back and do this and do that. So, as the first step I hope that this research may show Iranian ex-

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"Since the late twentieth century, the term ***diaspora*** (Greek διασπορα, a scattering or sowing of seeds), has been used (without capitalization) to refer to any people or ethnic population) forced or induced to leave their traditional ethnic homelands, being dispersed throughout other parts of the world, and the ensuing developments in their dispersal and culture.

Originally, the term ***Diaspora*** (capitalized) was used to refer specifically to the populations of Jews exiled from Judea in 586 BC by the Babylonians, and 135 A.D. by the Romans. This term is used interchangeably to refer to the historical movements of the dispersed ethnic population, the cultural development of that population, or the population itself."

[8] Ghorashi has quoted it from: Clifford, James (1994) Diasporas, *Cultural Anthropology,* **9**(3), 302-38.

patriots possible ways to serve their country (i.e. the target group Iranians who live out of Iran and have something to do with software and/or investment on it).

But of course nobody helps anybody else, even his own motherland, without bilateral expectations. Such expectations should be fair and rational. I may cover a part of these rational expectations.

It is also most desirable to contribute and offer some possibilities to other target groups mentioned in the next subsection (1.2.4). In addition to that, this project is expected to help develop the country's software industry which is an essential tool in the improvement of both economic and social standards.

Nowadays, the economic situation in Iran is experiencing some of its worst and most critical days in the last five decades[9]. On the other hand becoming global or "Globalization" is also another very important issue not only in Iran, but also in all developing countries. Both of these issues involve data and the informatics industry, in which areas Iran is decades behind the developed countries.

In this regard, software production and export can be very important for Iran. It can play a major role in the job creation process, can help gain money for the country, and is a very urgent necessity for progress in automation of industry and office services.

Yet the unseen effects of a progressive software and IT industry on easing and lubricating all other aspect of social life and business and industry, is far more than this. Even if we accept that the return of Iranian emigrants (or foreigner experts if we want to be more idealistic) in order to work in Iran and rebuild the country is almost vital and urgently needed; one of the most important steps to acquire this goal is to upgrade living standards (which are currently very much lower than those of progressive countries). Electronic government services also need to be prepared; which in turn involves the establishment of metropolitan software infrastructures and enterprise software systems[10].

Another important aspect of IT is related to the reconstruction of old systems. Many organizations in Iran are trying to renew and automate their antiquated office systems and control methods. All these systems need huge amounts of new up-to-date hardware, and then efficient software to work properly. This in turn, increases the need for internal usage of software and intensifies the importance of developing the software production industry in Iran. New methods and services have been in use for a long time all around the world, but Iranians have not even heard of their names. As a few very primitive examples we can mention new banking systems, extended usage of electronic money, electronic governance, electronic trade and finally electronic media which is the only item that is already well known and popular in Iran due to extensive censorship over internal media.

The writer of this thesis hopes that this research can have a share in developing the IT industry in Iran, as well as encouraging other researchers to work on issues related to this country.

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[9] Even the last president called himself 'the Robin hood of Iran' in his elective contest, pointing out the deep and large gap between the high classes of the community and the majority of people most of whom live under the poverty limit.

[10] The improvement of economic and social standards on one hand, and the entrance of money and experts from foreign countries on the other hand, are interrelated in a cyclical manner that amplify each other and thus give benefits to all Iranians.

Development of Information technology in Iran and the issues of software production and export from this country are important for non-Iranian groups too. Many software companies are looking for cheaper and efficient outsourcing possibilities. Iran, with many educated and unemployed young people, along with rich, educated and experienced Diaspora all around the world is a very good choice. Research such as this can illuminate their way in pursuing investment policies in the long term.

1.2.4 Expected target groups

Five groups of people may get benefits of this research:

1. That group of Iranians who live outside the country, but desire to give a service to their home land; in other words the diasporas or expatriates.

2. Those who produce software and feel the need for more qualified staff, new ideas, up to date knowledge and who are looking for better markets for their products (mainly inside Iran).

3. Those that produce software and look for better and cheaper sources to do the job and consider Iran as a choice for outsourcing and look for efficient contacts with and reliable consultants on Iran (mainly outside).

4. Policy makers in the government structure.

5. And finally, of course I should add university research groups that assist and consult with the three above organizations (items 2-4).

1.3 Methodology

Chapter 3 is dedicated to methodology and I have presented a detailed discussion on the methods that I have used and their efficiency, there. In this section I review those methods in brief.

The first point in this regard is the approach that I have chosen to reach the results from the findings. As this thesis is originally based on Nicholson and Sahay's report on building Iran's software industry, I chose their strategy which they mention as *interpretivist* [3].

As my work is not a quantitative research I have no explicit numbers to get direct results from. Instead, I have used only qualitative methods, so it is very important to keep my neutrality against what I have found and what I conclude from the results when I interpret my findings. Anyhow, I am an Iranian and it is very natural that I have pre-biases towards what is going on in that country. Yet, I have done my best to keep fair and as Nicholson and Sahay point out, interpret the role of each actor according to his own perspective, and not compare it with my own beliefs. This issue is discussed in section 3.1, Nicholson and Sahay's strategy description.

After that I have described all qualitative methods that I have used in my research in section 3.2, qualitative methods description. I have mentioned 7 different techniques there, but one of them, statistics, is in fact a quantitative method. Yet, as I have adopted them from other sources, and haven't searched for them directly, I haven't separated it from qualitative methods. Anyhow, all used methods can be grouped in three major groups:

1.3.1 Direct observation

In some parts of this thesis I have used my direct observation as a tool to describe happenings. Two of these situations in which I have used this technique more than other parts are chapter 2, "Why Iran has so many diasporas" and in case 12 on BIHE in chapter 7, case description and analysis. As I haven't done any of these activities as a part of this research, and they have been shaped during a long time in the past without any direct relation to this thesis; it may seem that they are in contradiction with the 'research' nature of this thesis.

But this is not right, because 'direct observation' is a qualitative method anyhow, and there is not such a rigid limitation on the duration of a study. So I evaluate my own information in these fields as valid enough to be used in my thesis. More description comes in section 4.2.7 of chapter 4, methodology.

1.3.2 Interview

Interviewing those Iranians who are involved in software production or any IT affair and/or its outsourcing from Iran (or other countries) is one of the most important tools that I have used in this research. I have interviewed 18 different people that have a hand in this industry, including Iranians and non Iranians.

The following subsections in chapter 3 are relevant to this method:

4.2.4 Interviews

4.2.5 E-mail Corresponding

These methods are explained in chapter 3, research methods; and the extracted material from interviews and correspondences are discussed in chapter 6, case description and analysis.

1.3.3 Reading

Another important part of my work to prepare this project has been reading different resources. These readable materials are the complement to interviews in order to complete the empirical part of the work and prepare proper and sufficient information.

The following subsections in chapter 3 are relevant to reading method:

4.2.1 Books and Articles
4.2.2 Newspapers and Internet News Agencies and TVs
4.2.3 Relevant Websites
These methods are explained in chapter 3, research methods; and the extracted materials are discussed in chapter 5, literature review.

1.3.4 Quantitative method

As mentioned earlier, I have also used different statistics from online sources. These statistics are not classified in the above three categories, as they are not considered to be a qualitative method. But as I have gained this information from other sources and have not gathered them personally, it is possible to classify them in subsection 1.3.3. Anyhow, the method's description has come in chapter 3, subsection 4.2.6; and the information is mostly used in chapters 2 and 3.

1.4 Overview of the theoretical basis

The theoretical basis of this thesis is based on the software export success model, used as the theoretical model in Nicholson and Sahay's article on Iran's software industry.

This model is illustrated in figure 1.2 (page15). As the figure shows, the problem of this research is mostly involved with the higher levels of the model (international market, international linkages and trust, and national software industry). As the overall result of the efforts of the Iranian government in national vision/strategy level has obviously been negative[11], and IT infrastructures are very weak in Iran, we can decisively say that the first two levels of the model are not built yet. This bitter fact makes research on the higher levels more difficult and more sensitive.

Detailed explanation of this model and the theoretical basis of this thesis is given in chapter 4, theory overview.

1.5 Overview of the empirical basis

The empirical work that I have done for this research, as mentioned in section 1.3, can be grouped in four main groups: direct observation, reading, interviewing and finding statistics:

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[11] United State's embargo on Iran, lack of foreign investment in Iran, international problems and tensions like the nuclear issue and terrorism, are only a few examples of the negative consequences the Iranian government's strategy.

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                International Market Demand for Software
                         ▲                              ▲
                         │                              │
International             │                              │           Trust
Linkages                 │                              │
                         ▼                              ▼
                        National Software Industry
              Clusters        (Competition)        Collaboration
                                    ▲
                                    │
                        National Software-Related Infrastructure
              People      Technology      Finance      R&D      Other
                                    ▲
                                    │
                        National Software Vision/Strategy
                              Government    Industry
```
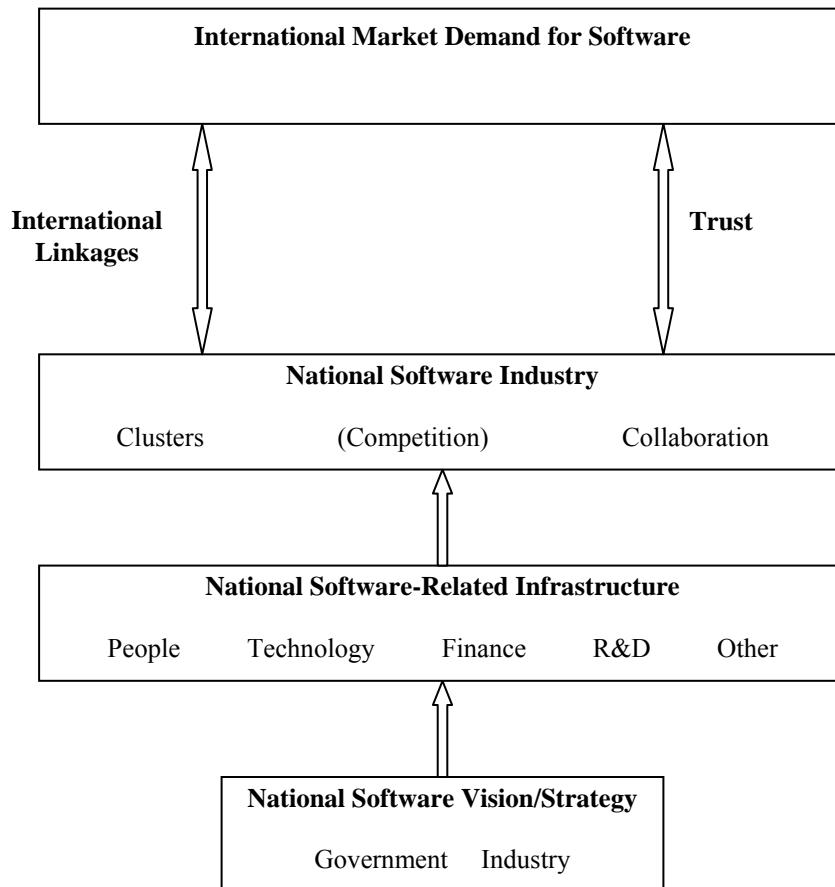
Figure 1.2: The Software Export Success Model

- Direct observation is relevant to the past and I haven't done it particularly for this research, but I have used my personal observations in this thesis. Anyhow, this activity is used most of all in chapter 2, the current situation.
- The reading material that I have used is presented in chapter 5, literature review, in detail; and the methods are described in chapter 3, methodology

4.2.1 Books and Articles

4.2.2 Newspapers and Internet News Agencies and TVs

4.2.3 Relevant Websites

- Interviews and correspondence via E-mail and telephone are mostly presented in chapter 7, case description analysis in detail, but a good deal of them is also used in chapter 2. Methods used to implement this part are described in chapter 3, subsections ….

4.2.4 Interviews

4.2.5 E-mail Corresponding

- And finally extracting statistics which is mostly used in chapter 2, the current situation; and the method is explained in chapter 3, subsection 4.2.6.

1.6 Structure of the thesis

In addition to this chapter, introduction, this thesis has six other chapters.

Chapter 2 begins with a short introduction of Iran, and then section 2.1 has a short history explaining why there are so many Iranian expatriates. Section 2.2 represents few statistical proofs for the previous one. The last two sections give reasons for this vast emigration from Iran and explain some of its negative consequences.

Chapter 3, current situation, first shortly reviews Iran's current economy and then explains the current situation of IT infrastructures.

Chapter 4 is 'Methodology' and explains the different methods that I have used to gather the information for this research. It begins with a short explanation about the interpretivist approach, which is adopted from Nicholson and Sahay's article. In the second section of this chapter I have explained different qualitative and quantitative methods that I have used.

Chapter 5 is 'theory overview' and is dedicated to the theoretical basis of this thesis. As mentioned in section 1.4 this research is theoretically based on the software export success model, which is again adopted from Nicholson and Sahay's article. This model is illustrated in figures 1.2 and 4.1, and detailed explanation about its relation with this research is given in chapter 4.

Chapter 6 is dedicated to literature review and reviews all the reading materials that I have read for this research; including books, articles, newspapers, and also online materials.

Chapter 7, description and analysis, covers the most important part of my empirical activities; and that is my interviews and E-mail correspondences. This chapter contains both classification and my own analysis of what I have found; and at the end a short description of my several interviews are added as case studies.

The final chapter, Chapter 8, is obviously the conclusion; and introduces a few ways in which Iranian diasporas can help their country to develop its fragile software industry. As in other chapters, analysis and discussion is added to each recommendation.

Chapter 2: Why Iran Has So many Diasporas?

Iran lies in Western Asia, the region that is called the Middle East, as you can see in figure 2.1. Iran is one of the countries in the world with the most neighbors, as it is bordered by Azerbaijan, Armenia, Caspian Sea and Turkmenistan to the north, by Turkey and Iraq to the west, by Pakistan and Afghanistan to the east, and by the Persian Gulf and the Oman Sea to the south. It also has water borders with Russia and Kazakhstan through the Caspian Sea, and with Kuwait, Saudi Arabia, Qatar and U.A.E. through the Persian Gulf and finally Oman through the Oman Sea. It covers 1,648,000 square kilometers and has a seacoast of 657 kilometers along the Caspian Sea on the north and 2,043 kilometers on the Persian Gulf and the sea of Oman on the south [12].

Figure 2.1: The Middle East and position of Iran in the region [13]

According to the latest statistics (November of 2005) announced by 'the statistics Centre of the Country' Iran has a population of 68,467,000 and it is growing on average by a rate of 900,000 people a year [14]. The current political regime is the 'Islamic Republic' from 1979 in which the theocratic Supreme Leader has the ultimate power, despite the fact that the country has both a parliament and a president. Although the regime is called a 'Republic', no political parties are allowed in Iran.

This chapter gives a short review of Iran's history, then an analysis of the reasons that scatter Iranian elite classes around the world.

2.1 History overview

Iran has 28 centuries of written history[12]. During the first 14 centuries it was an empire. During this period Iran was only ruled over by foreigners for 60 years (by the Greeks).

But in the second 14 centuries, beginning with the invasion of wild new Moslem Arabs, Iran has been almost always either occupied or ruled over by non-Iranian kings, except for few short periods. It has been (and is) divided in several regions and war, famine and disease have always been dominant. In such conditions many people are either obliged to escape from their birthplace to survive, or they have to move to other places in search of a better life and new opportunities.

So, emigration from Iran in large numbers is not something new. Intellectuals and elites and even ordinary people, have escaped from this country in big groups many times during the last 14 centuries. But it has never been easy for any of them. Because Iranian culture, traditions, society, language and even history and geography is so unique, that once one gets used to it, he can nowhere else find such cultural elements to satisfy his social needs [15]. Aside from problems and difficulties that all escapees, refugees and emigrants have, Iranian expatriates have been facing this problem rather more intensively than others[13].

Anyhow, right after the Arabs' invasion from the west, many Iranians emigrated eastwards to India in order to practice their religion freely. Their offspring are still called 'Parsian' (Persians) and they are one of the high-ranked sects in India's community and occupy very good positions there.

An outstanding example of them, are the Tata family who are one of the biggest owners of industry in India. The Tata Group produces many things, from steel and motors and cars, to IT products. The Tata Group comprises 93 operating companies in seven business sectors: information systems and communications; engineering; materials; services; energy; consumer products; and chemicals. The Group was founded by Jamsetji Tata in the mid 19[th] century. The Tata Group is one of India's

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[12] 2006 is equal to 2714 from the beginning of the Median Empire.

[13] Mohammad Ali Islami Nadooshan mentions seven reasons for Iran's particularity and uniqueness in his book: "Iran and its loneliness". He points to these seven factors: geography, history, language and culture, religiousness, psychiatrics, power of civilization-making and finally Sufism. 16. Pzhoohandeh, *About Iranian Identitiy (2)*, in *Payam-e-Baha'i*. 2005. p. 25-28.

largest and most respected business conglomerates, with revenues in 2004-05 of $17.8 billion, the equivalent of about 2.8 per cent of the country's GDP [17].

When the Mongols invaded from the east, many Iranians escaped west, towards the Roman Empire at that time, and Turkey at present. Jalal'eddin Mohammad Balkhi, known as Rumi belongs to this period.

A few centuries later, Safavid kings massacred Sunni Muslims and made those who didn't want to convert their religion escape both ways, to India and Rome. In India, 'Ostad Isa Shirazi' made the 'Taj Mahal' for 'Shah Jahan' [18] [14]; and Iranian poets of his (Shah Jahan's) court established the Indian style in Persian literature.

Thus, with thousand years of history of civilization, in the early twentieth century (in 1925 when the Qajar dynasty changed to Pahlavi) there was only a population of about 10 million left in Iran. This was due to long-term wars, shrinking of the borders and continuous famine and infectious epidemics[15], in addition to emigration. During the last 80 years this number has grown to about seventy millions, yet the rate of emigration is one of the highest ever seen or remembered. It is estimated to be between 5 to 10% of the total population (in the last three decades) and it may grow to more than 10% as it is growing continuously.

If we want to know the reason for Iranians' movement in large numbers; first of all we should remember that in general there are two main reasons for emigration: either from the fear of tribulation and discomfort, or in the hope of luck and a better life [20]. Those who escape because of fear, will find safety and those who move in search of luck, will find new opportunities. Now, as both reasons are valid for Iranians, they get both benefits. So it is very natural that everybody who is able to move, tries his fortune outside the borders.

In order to have a more specific look at the trend of Iranians' emigration from Iran, its shape and its side effects on the software industry, we first have to split the time period into two distinguishable parts: before the revolution (until 1977) and after the Islamic revolution (from 1978 and later).

2.1.1 Emigration from Iran before 1978

Before 1979 emigration from Iran had a normal trend and didn't happen in large groups. Those who wanted to have more social freedom, or a more modern and luxurious life, used to move from Iran to Europe or USA. Yet both this reasons could be categorized in the 'hope of luck and a better life' category. Relatively speaking, there was no serious threat for political opponents of the regime (I don't claim that it was zero); and those who desired a better life, had enough hope to stay inside Iran and wait for a better future. So compared with what happened in the 80s and 90s, emigrants proved to be a very small group.

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[14] Amazingly, the Taj Mahal of 20th century, the Baha'i temple of New Delhi which is like a lotus flower, is also built by an Iranian architect, Fariborz Sahba. [19. Zargarpour, H., *The Ethernal Lotus*, Ibid. p. 37-43.

[15] Only from 1880 to 1920, an estimated number of half of the population have died from famine and epidemics.

Many students were studying abroad, but a big majority of them used to return home as soon as their studies finished.

Some members of religious minorities left Iran, Jews to Israel or USA, Armenians to California, and Baha'is to all other continents to teach their religion. Yet, because of regeneration, their communities were growing rather than shrinking.

Finally, future events showed that the trend in the 70s and before that, was very slow and had little or no negative effect on the cultural and economical life of the country.

During this period, at least in the 70s, Iran was a frontrunner in the use of technology and particularly IT in the Middle East. All American companies, and above all IBM, had active branches in Iran at this time.

2.1.2 Emigration from Iran after 1979

By the beginning of unrest and rebellions in 1978, many people felt danger and began to exit the country. Most of these people were the owners of big capital and major industrial assets. They took with themselves whatever they could and left the rest to be later confiscated by the 'revolutionary courts'. After the overturn of the monarchy in February of 1979, horrible waves of arrests, execution and confiscation of assets overshadowed the whole country. So, a big wave of escape and emigration began among the higher classes of the society; those who had big assets or high positions in the previous regime tried to reach 'the other side' and save their lives as well as saving the rest of their money; meaning the part that was not confiscated and was transferable into cash money. The direction of the entrance of money into the country reversed and money began to exit the country rapidly. Owners of many factories escaped and their industrial units lost efficiency or bankrupted and closed down. The economy began to descend and the value of the US dollar, along with all other prices, rose up[16]. Those who were outside Iran in order to study or for other temporary reasons thought twice about returning.

On the 4[th] of November of the same year, few extremist students occupied the American embassy in Tehran and took 52 of its personnel hostages for 444days. Instead of punishment, the hooligan students received many thanks and encouragements from ayatollah Khomeini, the clergy leader of the Islamic revolution. In this way the diplomatic relationships between the two countries were cut off and have not recovered ever since. As the US is the superpower of technology, science, industry and of course money in our time, good and near relations with this country are very important and even vital for all other countries on the Earth. Instead of creating positive relations, Islamic revolutionaries demanded that damages from the US government be paid to their country, but these that have never been recovered and don't seem likely to be compensated in the near future.

Americans' first reaction was putting an economical embargo on Iran which has not been revoked until now, as Americans extend and renew the sanction whenever it expires. The direct result of the US embargo on Iran has been the continuous

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[16] In fact the value of money unit began to collapse, but every body deciphered it in the other way.

weakening and descent of its economy[17] along with many other political and sociological negative side effects. As we will see later, the software and IT industries in Iran have suffered their most serious losses from this sanction which doesn't allow transaction of technology, products and money from both sides; particularly in relation to high tech and strategic knowledge and products.

The revolution itself, and secondly the US embargo had two lethal effects on Iran's young IT industry. First of all the new government fired and deported all American (along with many other western) experts and advisers, the presence of whom was vital for the Iran's software industry. Remember that in the 70s, software was a very high specialty and not very many people were able to run the main frames of that time. Although Iran had a few programmers and programming courses were planned in a few universities, yet they were working under the management and leadership of foreign managers and were not still independent and "standalone" (particularly in military fields).

Secondly, America's embargo prevented Iran from importing new high technology and it made Iranians move around in circles for a long time and fall decades behind the world in many ways, particularly in IT that has been developed faster than any other technology[18]. The boom of PCs happened almost a decade later than in developed countries in Iran. The software industry has never had a noticeable output, and still the most important software projects in Iran are average size Database projects. The boom of internet has not happened yet in Iran, as the government wants to control the stream of news and information into the country.

Another very strong reaction by Americans was their support and, as many analysts believe, encouragement of Saddam Hussein to attack Iran which caused innumerable damages to both countries.

The other revolutionary move that caused great damages for the science and technology, and as a result for the software industry of Iran, was closing down all the universities for 3 years (1981 to 1984) under the name of 'the Cultural Revolution'. After the reopening of the universities very many professors and students were fired (many of them were also imprisoned and even executed) and many textbooks were censored or altered. The lack of software experts at that time, made a big problem for the very few computer companies that were active at that period [21].

The following social belief got shaped and spread after the revolution: "Leave Iran as soon as and in any way you can, only fools stay in here. It's not a place of living anymore."!

The war begins

Less than one year after the occupation of the US embassy, on 22nd of September 1980, while American hostages were still imprisoned in Iran, the 8 year war between Iran and Iraq began, a war with no result that killed between 450,000 to 1 million young Iranian men (depends on who gives the statistics) and almost the same number

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[17] The value of the Rial, the Iranian money unit is a good example. One US Dollar was about 70 Rials in 1979, and now (March of 2006) it is 9150 Rials. This has happened while the value of US Dollar is now by far less than its value at 30 years ago, due to inflation.

[18] Other causes that supported this negative effect were mismanagement in all levels and weak economy.

of Iraqis. The descent of economy and money value accelerated and life became more difficult day by day. More and more factories and companies were bankrupted and closed down, more money went out, hundreds of billions of dollars burned and destroyed as a result of this war; and worst of all, the drain of brains and assets increased drastically. Those who were temporarily staying in foreign countries decided to change their nationality and reside there permanently.

The majority of single escapees during this period have been young men, due to the danger that threatened their life on the warfronts, and the vague and uncertain future that was awaiting them. Although this factor was added to the death of young men on the fronts and changed the demographic balance between male and female in Iran, most families were still too conservative to let their single daughters leave the country alone and live in a culturally different atmosphere in which they were able to do whatever they want.

In 1985 Iranian forces suffered serious defeats on all fronts and Khomeini was obliged to "drink the cup of poison", as he himself pointed out to his acceptation of the peace. The war ended with no particular result apart from hundreds of thousands of dead and disabled people, most of them young men, and huge destruction and the last but not least, the seizure of the monopoly of power by mafia groups shaped by mullahs and their family members and close friends.

In 1978 one US dollar was equal to 70 Rials which had not changed for the last few decades. At the end of the war, in 1988 it was about 1000 Rials. In August, after the declaration of the end of war, dollar prices suddenly decreased to 500 Rials in a short time but eventually went back to the same price and even more in few months. This sudden unexpected shock had very much many negative effects on the economy. Although a few people gained money, the majority suffered huge losses, on both the decreasing and increasing trends. Many companies and people became so badly bankrupt that a few people committed suicide; even though period the powerful Rial lasted only a very short time.

At this time PCs were still not so popular in Iran and the pervasive technology, even in the universities and governmental companies, was still that of the late 70s. First of all, because PCs were still rather expensive, as the economy was not good in Iran. Secondly because the wartime atmosphere prohibited the majority of the community from buying and exploiting something that was still considered more of a luxury than a tool of production and business. So software companies were still limited and software experts were scarce. Iran was no longer a leader in IT (and anything else except for fundamentalism) in the region.

Less than one year later, on 4th of June 1989 the 90 year old ayatollah died and the president at that time, Ali Khamanei, became the supreme leader.

Hashemi Rafsanjani seizes power

Ali Akbar Hashemi Rafsanjani won the presidential election in 1989 and called his government 'the construction government'. He meant that his first priority was reconstructing the destruction that remained from the 8 year war. Because of his vast power and dominant control over all affairs of the country, he was called 'Akbarshah'. He had assigned his family members to key positions and had (and still has) vast incomes from all kinds of corrupted economical activities.

During his 8 year government, mafia groups continued their cancer-like development and tried to eat up whatever seemed to be profitable in the country. Thus, lack of economic safety made more and more big assets escape from Iran and find safer places around the world, beginning from Dubai near to the southern shores, to Australia and Canada at the other ends of the world.

It seems that this government built a little bit, and changed the face of the country. But the bitter fact behind all these constructions was that they cost too much for Iranians. Any healthy leading system would have been able to build a "Norway" in Iran with the amount of money. The Islamic republic's leaders and managers wasted in national assets in whatever way they could: all of them have noticeable bank accounts and other assets in foreign countries. Almost all of the high rank managers of the Islamic regime, who are in fact members of a few mafia families, overpay any foreign (or internal) company to raise the amount of the contract, in return for a good share that they receive. You witnessed a bribery scandal between Hashemi's son and StatOil just last year in Norway. This way lowest quality jobs are done with the highest price. So the system has to scatter lawful and reliable qualified managers and give high positions to non- qualified people, who are ready to cooperate with the mafia, in order to continue having illegal incomes.

The gap between poor and reach became too deep and the average class of the society went down so much that it turned into a poor class in fact. The price of US dollar was about 1000 Rials at 1987 when Hashemi became president and 9000 Rials at the end of his presidency in 1995.

During these years, the Islamic government which had international problems to execute its opponents openly, tried to get rid of them by terrorizing them either inside or outside the country. Although this was not a new method, a decrease in the executions[19] resulted in an increase in terrorizing and assassination activities. Many writers and political activists were killed serially without any further investigation by the police (both inside and outside Iran).

So, during this period, all hopes for the recovery of democracy, human and social rights, economic progress and eventually a better Iran after the war, died in the hearts of all those people who believed that the war was the reason for the country's endless problems. They used to say the 'Islamic Republic' will become democratic and modern as soon as the war ends and Iranians will witness freedom and economic development afterwards. But after a few years it became clear that Hashemi and other mafia heads had prolonged the war in order to misuse the unstable situation and obtain more power and money. So a new wave of immigration began. This time there was a big difference: not only those people who disagreed with the regime and hated the mullahs, but also many of those who agreed and even cooperated with the regime and loved Islam, found Iran no longer a place for living.

Although during this period the use of PC computer at homes and in offices became popular and widespread, but the new technology of big computers still didn't enter Iran, and the use of PCs was also limited to small data bases, primary graphics

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[19] The climax of executions was in the summer of 1987 just after the end of the war. During few weeks thousands of political prisoners (estimated to be between 3 and 12 thousands), were executed without prosecution. Most of them were sentenced to limited imprisonments and many had suffered their sentences completely and should have been freed in a short time.

and game. Even today if you go to Iran and observe big enterprise's Databases, like banks and governmental companies, you realize that the architecture of the system is not proper for the size of it and it follows small business architecture. The reason may be the lack of experts and enterprise projects managers or even poor economy that prohibits the success of big projects, but above all the reason may be deep corruption in the high levels which prohibits good choices. The high level managers have not enough specialties and the broad vision required for their positions. They even choose the winners of the contracts according to the bribes they receive or the family relation that they have, not according to the real qualification[20].

The internet boom, in 1995 was only a legendary tale in Iran and most computer users had only heard something about that, let alone the ordinary people. So it is obvious that no institution offered web services at that time. Even now after 10 years, I don't know any company that offers a real web based service[21].

'Reformists' win the election in 1997

In 1997, Mohammad Khatami who was previously a moderate minister in Hashemi's cabinet, won the presidential election with the slogan of reform and social freedom. Again, all those who thought that it is possible to reform the 'Islamic Republic', hoped that Khatami will give them enough social freedom to breath, and he will lead the country to decrease the tensions with the rest of the world; and then economic development will follow that[22]. But even if Khatami was truthful about what he promised (now that many doubt it) conservatives didn't let him to do his job and made too many obstructions to his program in order to defeat the reform and reformists. Once it was said that Khatami has encountered averagelone crisis every fifth day.

Fanatics did whatever they could in order to embarrass Khatami, but in fact they put more pressure on ordinary people and made many of them escape the country. Although Khatami managed to keep the dollar's price between 8000 to 9000 Rials, but the inflation rate was always more than 10% per year, even sometimes more than 20 percent. Eventually all his economical corrections resulted negatively instead of making anything better, just because of the mafia's determination to embarrass and discredit him.

He tried to give a little social freedom to people, but fundamentalists did their outmost to undo what he did. He even arrested the governmental serial murderers, but none of them was prosecuted and after a short time all of them came back to their previous positions.

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[20] Once I had got my bachelor newly, I received an offer to mechanize a big petrochemical complex's selling system. A friend of me had got the offer, just because his father had a position in a petrochemical factory, and his partner was a member of 'sepah-e-pasdaran'. I rejected the offer as it was too big for us (and I was the only member of that teem who knew something about software engineering), but it was completely possible for us to get the contract and sell it to another teem who was not necessarily qualified for that job again. Such a method is valid for almost all projects and contracts.

[21] There may be few problems that prohibit companies to offer web services. There exists still no electronic money in Iran, cheating's rate is too high and the culture of web based services is not established yet. The number of internet users is also less than that of developed countries.

[22] Many called him 'The Gorbachev of Iran' at first, but it was just a great expectation.

Eventually Khatami, like all his predecessors and colleagues, disappointed everybody and made many Iranians, most of all educated and qualified and experienced ones, leave the country in search of a better life and a free atmosphere to live in. Almost everybody came to this conclusion that it is utterly foolish to wait or even hope for a better life in Iran.

Despite his government's slogans of renewing the country's infrastructures and the fast progress of the IT in the world, IT had no measurable progress in this period. The slow and insufficient progress and improvement in the IT atmosphere of the country was due to the irresistible improvement wave of the hardware and networking technologies, not a structured national vision and effort to build the IT infrastructures. In fact, previous problems continued to bother the software industry and prohibit the implementation of big national projects like the banking system, national registry system, tax system and so on.

A very major negative factor for IT in Iran in this period was the discovery of Canada as a country willing to accept emigrants, particularly educated and experienced young people[23]. Almost all the owners and managers and senior programmers of software companies that I knew, have emigrated to Canada during the last decade. The only exceptions either have had an opportunity to go to the US, or have gone to Dubai, or are preparing to go to Canada in the near future. Having an open (under process) application in the Canadian embassy among the elite class of the Iranians, is nowadays an obligation like having a car or a mobile phone.

'Conservatives' counterattack

At the end of Khatami's 8 year presidential period (two 4 year periods), the conservative wing of the Islamic government decided to stabilize the monopoly of the power in their own hands. So during a corrupt election, a notorious member of the 'Sepah-e-Pasdaran' (the army of patrols) called Mahmud Ahmadinejad was assigned as the president.

Ahmadinejad attended the election with the slogan of improving the life of poorest classes and called himself the "Rabin hood" of the Islamic Republic. He gave his word to fight economical corruption and cut the hand of the mafia families off the oil industry[24]. But the mafia is more powerful than him and he has withdrawn from all his claims until now (March 2006).

Moreover, ascending trend of the economical indexes has accelerated. The index price of stock market of Tehran which had fallen down from 16,000 units to 12,000 units during the whole eight year of Khatami's presidency, fell down to bellow 10,000 in only three months from the beginning of Ahmadinejad's time. This index is still descending, but slowly and now (March 2006 at the end of the Iranian year 1384) it is about 9,800 units [22]. The value of transactions of the Tehran stock market has dropped more than 8 billion dollars (70%) only form March to October 2005. the value

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[23] In 1991 a friend of mine got Canadian residence with 9 years experience as a depot keeper and without a high school diploma. In 93 another one got residence with a technical high school diploma in electronics. In 95 applications without bachelors were not processed at all. In 98 my friend who got Canadian immigration had two masters in telecommunication and physics. Now you can not apply without at least master and years of experience.

[24] He obviously meant Rafsanjani family by this.

of the national money unit (Rial) is falling steadily down and inflation is estimated to be more than 15% [23].

One of most troublesome activities of the new president has been his claims against the benefits of the western powers. He has intensified three major problem areas in which the Islamic Republic has been involved in for a long time. First of all he has requested elimination of Israel from the map. In this relation ha also has denied the holocaust as a rational reason for Israel's existence. The second intensive problem is Iran's nuclear program which at the time being is still controversial and has doomed the future for all Iranians. Now that Americans want to put the Islamic government under pressure, supporting and involvement in the international terrorism is the third issue that they put forward in order to make the Islamic regime's dossier heavier.

Khosro Pakbaz, the Iranian economist who resides in France, describes each speech of Ahmadinejad as a nuclear bomb on the Iranian economy [24]. He has caused an acceleration of the exit of assets and brains from Iran in less than a year from the start of his presidency and as you see, the situation worsens everyday. Another discussion on Iranian economy comes in chapter 3.

2.2   Statistics

As a proof of the above statements on immigration of Iranians from Iran during different periods we can look at the statistics of their emigration to Norway. These statistics are extracted from the official site of Norway's statistics central office (SSB) [25, 26].

The first chart in figure 2.2 shows the number of Norwegians of Iranian origin in 1970, 1980, and then from 1986 to 2005. As you see, the number of Iranians before 1979 has been very little, and until the end of the Iran-Iraq war it has been less than 1000. The first wave comes with the end of the war. It is not possible to judge the exact rate of escaping from Iran according to this chart, because Norway's emigrant accepting policies have affected it too. But it is obvious that a constant stream of emigrants have come out of Iran ever since the Islamic revolution.

The second chart in figure 2.3 shows exactly the same data as in the previous one, but discriminates between men and women. This one shows that while in 80s the number of men has been twice, or even in some years three times more than that of men; in 90s this tow numbers have become closer to each other and after 2000 women have exceeded men. In 2005, 227 men and 250 women have immigrated to Norway; the same statistics show that the above numbers are 2103 men and 2234 women from 2000 to 2005.

The third one in figure 2.4 shows Iranian residents in Norway (without changing their nationality) from 1977 to 2005 discriminating between men and women. It shows a rush towards Norway after the end of the Iran-Iraq war, but it is difficult to separate the Norwegian governments' policies from Iranian's tendencies and attitudes. Some similar statistics are extractable from official sites of statistics institutes of other countries too, that show more or less similar patterns. But quoting them here makes this section too lengthy.
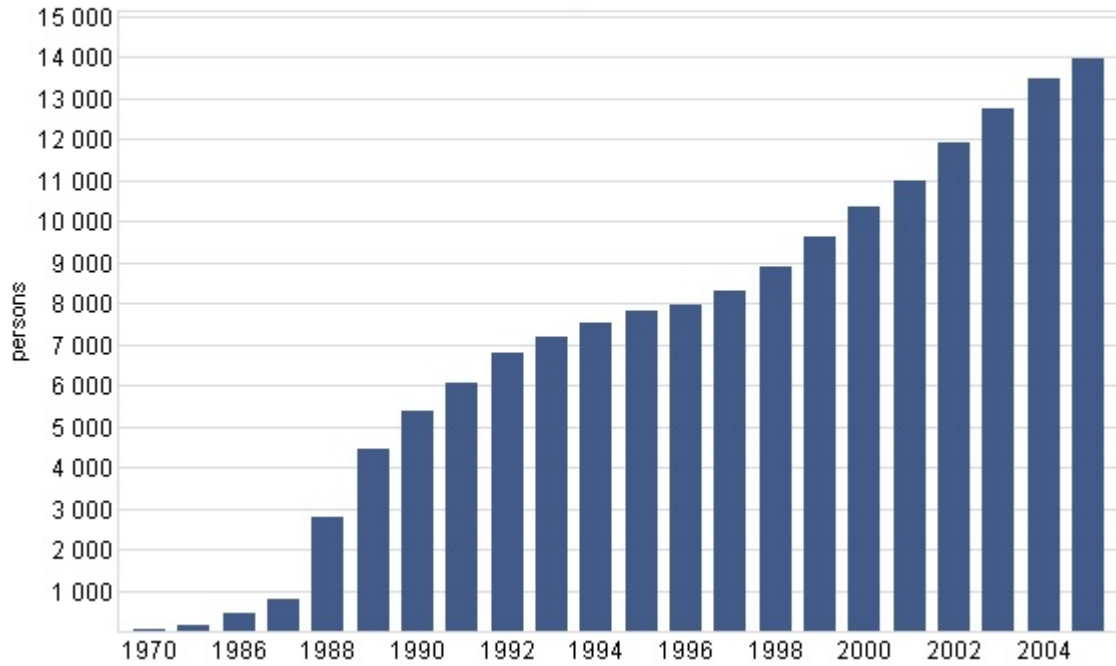
Figure 2.2: The number of Iranian immigrants to Norway from 1970 to 2005 [25]

Figure 2.3: The number of Iranian immigrants to Norway from 1970 to 2005, separating men and women [25]

The main problem in showing the trend of immigration and escape from Iran, is that Iranian official authorities release no statistics on such themes, and all opinions are more rough guesses rather than accurate statistics.

**Population,
by sex and time.
Persons, Iran.**
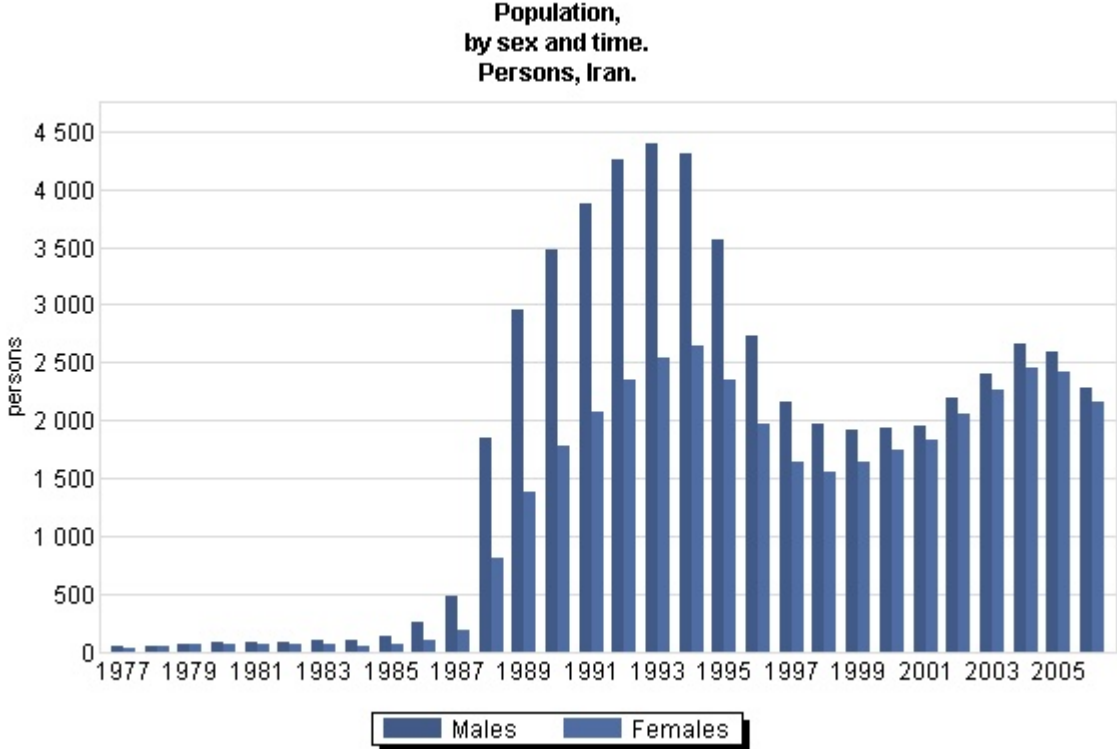
**Figure 2.4: The number of Iranian residents in Norway from
1970 to 2005, separating men and women [26]**

2.3 Summing up the reasons

According to our short review of Iran's recent history, we can sum up the reasons of Iranians huge emigration during the last three decades as following:

1. Arrest, imprisonment, torture and execution of those who are accused of disagreement with the regime without fair prosecution or any acceptable proofs: The unbelievable frequency and number of such occurrences after the Islamic revolution has made such an atmosphere of horror and terror, that not only have many escaped from Iran, but also many of those who are outside and have some political records, are afraid of coming back to Iran. Many of these people even don't talk to Iranians who work for the embassy or government, or are suspicious in any way (this is one of the problems for me to interview Iranians). It is noticeable that anybody who disagrees with the regime, is called 'enemy' of Islam and nation and even God. Although the reformist government of Khatami, tried to attract many members of these expatriates and convince them to come back

to Iran, still many of them cannot rely on the Islamic government due to bad experiences for a few of those who have returned.

2. Lack of social freedom: This one, along with economic problems are two major reasons for the majority of Iranians who have left their birth place that are categorized in the second group according to Mardiha; and in fact the other items that I mention here are secondary reasons. Economical problems limit the amount of pleasure that can be attained and lack of freedom doesn't allow such pleasures to be consumed [20].

One of the most important problems in Iran that is classified in this category is lack of freedom for women, particularly their clothes and cover. During the first decade of Islamic regime most of the single escapees were young men. This was both because of the war that was a threat mostly for young men and also that many families were still too conservative to let their young daughters live alone in a western community. Yet the number of the girls rose up by and by, such that the latest statistics show that the number of women among Iranian emigrants is more than that of men [27]. My own personal experience shows that many Iranian men who live in other countries are somehow desirous to go back to Iran and live there, but their wives are generally reluctant and disagree with this idea. Ali, a friend of mine who is a 50 year old software engineer, lost his job as a programmer in a software company in Oslo. Even though he wanted to go back to Iran and establish his own software company, his wife disagreed and now he is running a 'Narvesen' shop in Oslo. His brother-in-law has somewhat the same situation too.

3. Lack of fun and entertainment: One of the most important kinds of freedom that Iranians have lost is 'happiness'! The paraphrase of Shi'i mullahs of Islam says that God doesn't like happiness as it either is created by a sin, or may result in a sin or both. Drinking, dancing, having or attending a party and even listening to 'happy music' may result in serious kinds of punishment if detected, from whiplash and prison to huge fines. TV programs and cinema movies are censored and don't satisfy the audience. Many use CD/DVD or video or satellite programs, but the latter is illegal and the former has only recently been partially freed. In general fun and happiness are considered to be negative and sinful in Shi'i beliefs, so everybody in Iran is always under a sort of mental pressure.

4. Mourning and remorse based beliefs of the Shi'i government: The abovementioned pressure is doubled when the Shi'i rules recommend mourning and crying as something positive which God loves and pays after-death rewards for if you do it for Shi'i religious characters. The religious mourning days in a year are by far more than celebrations in the present Iranian calendar and it makes everybody depressed and tired of living in Iran.

5. Endless economic problems: As I will have a more specific discussion about this topic in chapter 3, I leave this one here and I just mention that the ever-falling economy of Iran is one of the most important reasons that makes people leave the country in search of a better life and a prosperous job.

6. Lack of safety for assets and capitals: Owners of big capital must invest their money and assets somewhere that they feel it is safe for their money. Iran has been shown to be one of the most dangerous places for investment. According to the United Nation's Commerce and Development Conference Organization, Iran is the 88[th] most attractive country for investment [23]. This means that Iran is not attractive at all and it is not appropriate for investment. This was in late 2005 and the situation has become worse since then as a result of wrong and aggressive policies of the Islamic government.

So, during the last three decades, since 1978 when the rebels began in Iran, the trend of money movement has always been continuously outward. Estimations declare that hundreds of billions of dollars have exited the country during the Islamic era. The reasons for the escape of assets are lack of both legal security and industrial security. So the foreigner investor doesn't come to Iran, and the internal one either escapes or goes towards the black market and underground activities [23][25].

It is very natural that the owner of the money moves with his money, particularly since many capitalists were executed during the first years of the Islamic Republic because of "corruption on the Earth" and "war with God". Endless numbers of wealth and assets have been confiscated; and the same trend still continues. Another problem for those industries or companies that do develop well, is that the mafia calls their owners and says that want to be your partner. You know of course that nobody can say 'no' to the mafia's offers. So, in a way, who ever passes a certain level of success and is not a member of, or connected to the mafia already, has no other choice rather than leaving the country and continueing his job somewhere safer.

7. Occupation of high positions by inadequate and incapable people and the marginalization of adequate and qualified specialists: Right after the victory of the revolution in early 1997, the revolutionary winners began to substitute the country's managers at all levels from the cabinet members down to small industry managers. But, the newcomers assigned only those people who were committed to the revolution and these people were not necessarily specialists, but also to a high extent they had no profound knowledge about their new job at all. This problem, made those specialists who worked under the management of illiterate managers resign and mostly leave the country. This, in turn created more vacancies for inadequate members of the regime's fanatics' mafia and the cycle continued inexorably. You can see that after the recent president came to power, he substituted very many high-level managers and even diplomats with members of his own mafia family, 'Sepah-e-Pasdaran' or 'the army of patrols'. Another negative side-effect of this procedure that encourages or makes people escape from

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[25] It is estimated that between 200 and 400 billion dollars have gone to UAE with 300,000 Iranians who have over 4,000 companies there, and about 600 to 800 billions to US with more than a million Iranians in it; let alone the rest of the world 23. Pakbaz, K., *Economical Report*, in *Ba Alireza Meybodi*, A. Meybodi, Editor. 2005, AFNL: United States..

Iran, is the widespread corruption that this group of the country's management has caused.

8. Nervousness, lying, people's dishonesty and in sum, the degeneration of social and human values: All the above problems have put the majority of Iranian population under such huge mental pressure that their social values have weakened and their mental health has been endangered. So many people leave the country hoping to find a calmer society to live in; and of course they do. Also many of those few emigrants who decide to return to Iran and spend the rest of their life in their birth place, find it too difficult to cope with the irrational people and systems and return to their foreign residence sooner or later.

9. Low living standards: In the same way, all living standards, economical, health, social and even educational standards have gone down during the last 3 decades. But in almost all other parts of the world, particularly developed countries, living standards have had and still have positive growth. This has made the difference of living inside Iran and outside of it too different for the majority of people, even the most wealthy of them to resist the temptation of living in a 'progressive country', whether it is Dubai just on the other side of the Persian Gulf, or USA, Canada or Australia on the other side of the Earth.

Two of my interview mentioned this factor as the reason that they have left Iran and live in Norway[26]. Kamran said that in Iran bureaucracy is so dominant over all aspects of life that you should spend a whole day for very small jobs like a payment in the bank, or get a small amount of cash from it, or insure your car. In Norway you can do all these jobs in a few minutes at your home from your computer. Hamid has exactly the same opinion and says that I want to live in a country that has a "correct system". It is interesting that both these men have married Norwegian girls and never think of returning to Iran.

2.4 The effects of emigration on Iran's population texture:

As I mentioned earlier, there are two reasons for emigration. One group escapes from the fear of tribulation and discomfort[27], and the second group seeks fortune and pleasure.

While moving for the second reason happens everywhere[28] in the world and it is to a high extent voluntary, it still has a few negative side-effects like putting stress on the emigrants and their families, imposing cultural and economical problems on the new

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[26] I haven't reported my interviews with these two in case studies of chapter 7, because the most important points of their opinions is mentioned here.

[27] Even trial, imprisonment, torture and execution

[28] As you know, in the recent centuries, European emigrants have populated the new world in America and Oceania

environment and loss of resources for the old place. However, when emigrants are obliged to move from their birth place for the first reason the negative side- effects are in all ways greater than in the other situation,

Even for those leaving to seek fortune and pleasure the negative effects may be great enough in themselves. For this group, despite the enormous differences between life in Iran and outside of Iran, they feel obliged to move as they have to suffer bigger problems and miss many opportunities if they stay in their homeland rather than if they leave it.

The number of the first group is limited of course, and the majority is with the second group. Normally, emigration of this group of elites, all around the world, is from the countries with 'low pleasure production' to the countries with 'high beneficial backgrounds' [20]. Maybe it seems that according to 'pleasure gross product' and 'per person pleasure product', Iran is not too much different from similar countries in its class[29], so it shouldn't have much more emigrants than the others. But the high rate of the elite emigration from Iran, confirms that its fundamentalist ideologist regime, has created an environment in which an important part of the "pleasure produced" is not consumable.

Such powerful motives to exit from Iran have increased the emigration rate drastically and continuously ever since the beginning of the Islamic revolution in 1978. This in turn, has imposed many negative effects on the country. Few of these effects ore obvious, such as brain drain or escaping of talented youth and experienced specialists along with owners of big capital and assets (with their assets transferred into money of course). We call these the 'elite', and their leaving eventually leads to a weakening of the society's human and economical resources. But there is also a hidden side effect and that is the deforming of the population texture or demography. It means that those who have escaped from Iran have not been equally distributed among all social classes, but because of the following reasons they have been from the highest classes of the society:

1. People in lower classes have less probability to get residence permit in other countries. As you know, in order to get residence permission in any country you must have some kind of social priority which includes higher education, a high degree of specialization, great experience, big assets or a prosperous business. The more you have of any of these, the more points you will have in an evaluation of any residence application.

2. During the first years of the Islamic regime, members of lower classes felt fewer problems with the regime and thus had weaker motives to leave the country. The more the economy fall down, the more members of all classes and particularly lower ones decided to seek a better place to live in. Yet still the members of higher classes have more chances to find one.

3. From the very beginning of the Islamic revolution, its leaders pretended to have socialist beliefs and leftist biases or tendencies and a serious determinations to support lower classes and poor people. So they made open and direct attacks towards higher classes of the community and even called them 'taghooti' which means 'related to Satan and devil' or 'rebellion to God' in Arabic. Thus the higher

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[29] Despite its bountiful natural resources, and the success of its diasporas that shows Iranians are capable of having a high degree of wealth and welfare, Iran is among the poor, third world countries.

classes and elite were clearly encouraged to leave the country in order to escape the revolution's consequences.

   4. those people who have a kind of progress, either educational or economical, eventually reach to a point that they can make no more progress in Iran; a dead end in fact. So they are the most motivated to move to firs world countries in order to keep going forward.

In order to illustrate this deformation of the population's demography, let's compare the demography of social classes with a pyramid, the top of which represents the higher classes and the bottom shows the lower classes. It means that the higher somebody's position is in the society –according to his education or wealth or important job or social status - he/she belongs to a higher social class; and his/her position in the pyramid in figure 2.5 is higher.
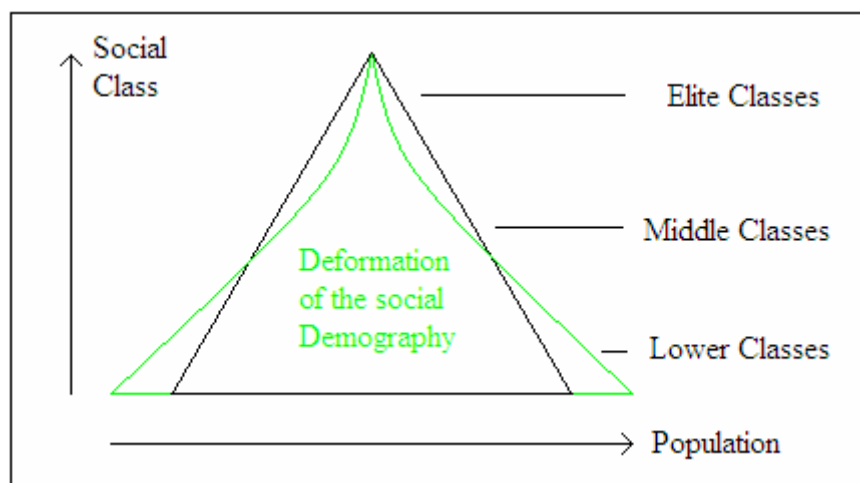
Figure 2.5: Pyramid of the texture of community's classes

In normal situation most of the members of the society are grouped in the middle classes, so the demography of the classes against the number of the members of each class is not like a pyramid. This normal curve is shown in figure 2.6. But Iran does not have a normal economy, so the distribution of social classes cannot be normal either. Wrong policies of the Islamic government have pushed the majority of the population towards lower economic classes (despite the fact that the number of highly educated people has risen drastically), and disturbed the normal form of this curve. The disturbed curve is shown in figure 2.7 in which most of the population are grouped in lower classes rather than the middle class. In fact we can interpret this effect in this way too: the Iranian middle classes have shifted into the poor classes after the Islamic Revolution.

The abovementioned wrong policies are those that have scattered the elite groups of the community and have made them escape the country and take out their movable wealth; thus have lowering the average wealth per person in Iranian society. The exit of assets, brains and managers in turn has lowered the production and decreased both GDP and GNP[30]; distributing 'poverty' in the community. Another reason for the

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[30] Under such circumstances, foreigner investors don't investigate in Iran too; and GDP decreases as well as GNP.

deformation shown in figure 2.7 is the unfair distribution of wealth in Iran which has given the control of GNP and national wealth into the hands of a very small group of very wealthy and powerful people, called the 'Ultra Rich' in figure 2.7. In fact, despite the statistics show that Iran has a high rate of economical growth of 6% [28], the majority of people experience a harder life every year because the produced wealth is not distributed fairly among all classes of the Iranian community.
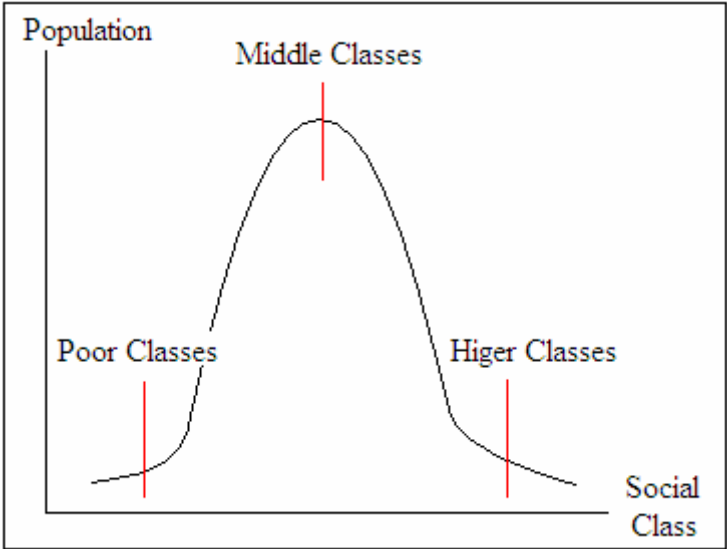
**Figure 2.6: Demography of community's classes in
normal and healthy economic situation**

Figure 2.5 is in fact the reversal of figure 2.7 where the places of the vertical axis and horizontal axis which represent population and social class, are exchanged. In order to clarify this pyramid, look at it like the hierarchy of an army.
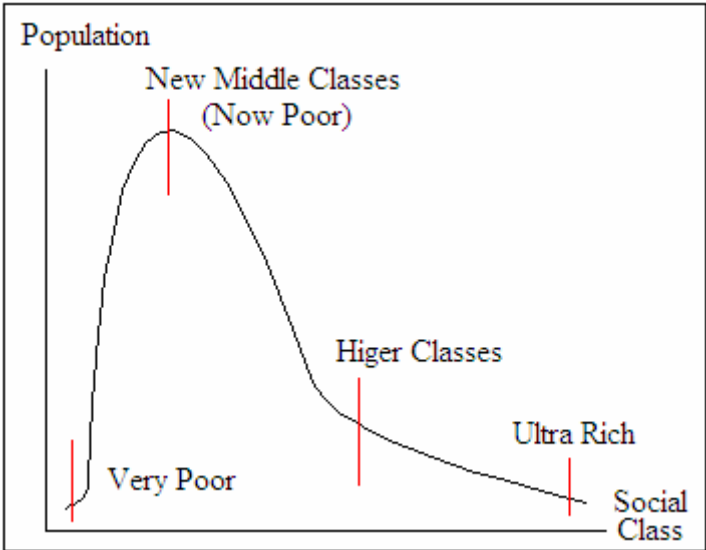
**Figure 2.7: Demography of community's classes in
disturbed and unhealthy economic situation**

The generals are at the very top and the soldiers are located at the very bottom. The higher one's rank is, the higher is his position in the pyramid. The same as an army can do nothing without generals and officers even if it has millions of soldiers; a nation needs good managers and powerful policymakers in order to increase its national product, regardless of the number of its work force. So, we see that the members at the top of this pyramid have a more important role in any kind of production as they represent the capital, knowledge and specialties.

Now that the intensive human resource loss in Iran has mostly scattered members of the top of the pyramid, the balance of wealth, knowledge and specialties in the country has been disturbed[31]. It means that brain drain and capital leakage are decreasing the total ability of the country as well as the average ability of each person to engage in production. As the trend of escaping from Iran still continues, the situation gets worse and worse everyday [29][32].

Our special case, software production, depends to a high extent on educated, talented and experienced human force as well as sufficient capital to develop proper infrastructures. In other words we have no manual or unskilled worker and almost everybody in this job is a member of the elite group; who can escape the country more easily than others. So it is not so strange if drain brain and capital leakage have a very negative impact on it. The positive aspect of this trend could be the international relations that Iranian expatriates can provide for Iranian IT industry, if it wasn't doomed because of the mistaken and destructive foreign policy.

While this present picture of the software industry is depressing enough, the view of the future is not hopeful either. Morteza Mardiha believes that in terms of science it may be claimed that the scientific production of Iran is heading towards zero and if nobody finds a solution for this problem, in the near future, the scientific environment of the country will be limited to those who have not been able to find a position outside of Iran due to their weakness of knowledge[33]. The best Iranian students leave the country to continue their studies abroad, but they stay there after they finish their studies and never come back. It is growing so much that the granting of scholarships by the government is going to stop[34]. Although Iranian students have recently performed very well in the scientific Olympiads, and they can enter the universities without entrance exams, more than 90% of them leave the country sooner or later [20].

In this relation, Mohammad Ali Islami Nadooshan, writes in his book "Iran and its loneliness" that lack of rationalism has resulted in Iranians wanting knowledge and science not for its own sake, but rather for the narrowly defined benefits that they get from science. This is one of the biggest reasons for the huge brain drain from Iran. Because according to the reasons mentioned in section 2.3, educated people don't find this priority in their own homeland as much as they have it in first world countries; and on the other side it is easier for them to seek residence in other countries. Following

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[31] This is another way that Islamic republic has in fact transferred the average class of Iranians into the poor class. Look at the figures 2.3 and 2.4.
[32] It is estimated is 150000 educated people exit Iran every year 29.   Nourizadeh, A., *Ba Alireza Nourizadeh*, A.R. Meybodi, Editor. 2005, AFNL: United States.
[33] Although I agree with this completely, it contradicts with the Islamic republic's claim that says Iran has a very high position according to the number of scientific articles.
[34] This has no use, as good students can get the scholarship from foreigner universities anyhow.

his abovementioned opinion, Nadooshan continues that until Iranians haven't found this background and attitude and mentality to love the knowledge and truth and want to discover the truth, Iran won't be able to join the caravan of global scientists.

Chapter 3: Current Situation

We cannot describe the roles of Iranian diasporas mentioned in the last chapter of this research without knowing about the economy and IT infrastructures in Iran. This chapter covers a short description of the country's economy followed by a descriptive report of the current position of IT infrastructures with focus on the internet in Iran.

3.1 Economy Overview

3.1.1 Overview of economic structure

The structure of the Iranian economy underwent fundamental changes after the 1979 Islamic revolution. All former laws or any sections thereof that violated the principles of Islamic law were declared null and void. Many industries, major sections of foreign trade, private banks and insurance companies were nationalized and brought under state control. The war initiated by Iraq against Iran in 1980 inflicted huge damage to the country's economy and impeded progress. A dramatic fall in imports, stagnation of industries, restriction on foreign exchange and increased price levels were all the results of the war.

At the end of the war with Iraq in 1988, Iran inherited a highly centralized economy. Most of the economic resources were administratively allocated through the vast public sector, widespread price controls, administratively mandated rates of profits and charges on loans, credit allocations, extensive trade and exchange restrictions, heavily subsidized energy and petroleum products, multiple exchange rates, and monopolies over large sectors of the economy, including the financial system [12]. According to the latest report of Heritage, Iran has the 156th place among 157 countries regarding economical freedom and its place will go down from 4.21 in 2005 to 4.51 at the end of 2006 [30]. It is noticeable that in this report 1 means the highest economical freedom and 5 means least freedom. This report adds also that Iran is only above North Korea which stands on the 157[th] step. It is stated that governmental economy along with high unemployment and inflation rates, high level of subsides and the inefficient private section are the reasons for decreasing economical freedom. All these decrease the levels of trade and foreign investment.

The abovementioned centralization has delivered the monopoly of power and wealth into the hands of a few mafia families and groups and this in turn has led to

deep corruption, deepening the gap between poor and rich, and eventually total destruction of the economic foundations and the exiting of talented people to countries with successful economies.

These distortions were compounded by Iran's excessive dependence on the volatile oil exports, which actually account for 85% of export receipts and 42% of government revenues.

Over the past fifteen years (1989/90 – 2004/5), the authorities have attempted to address the distortions and restore sustained economic growth, by implementing three five-year development plans. The direction of liberalization was reemphasized under the third five year development plan. However the opening of the economy continued at a slow pace. The period of the second five year development plan (1994/95-1999/2000) was characterized largely by macroeconomic instability and declining economic growth. As a result the authorities policy priorities shifted in order to rectify the macroeconomic and external debt imbalances, while the much needed structural reforms were delayed. The recovery of oil prices during 1999/2000 significantly strengthened Iran's external and fiscal positions. Thus international official reserves increased, external debt was reduced and further progress was made in trade liberalization and exchange rate reform.

The main challenge ahead is to build on these accomplishments with decisive structural reforms to sustain higher rates of growth and employment creation to absorb the rapidly increasing labor force in a context of declining inflation and financial stability. The introduction of value-add tax, the restriction of tax administration, the reduction of budget reliance on oil revenues and the eventual reduction of subsidies will be among the future liberalizing programs. Reducing the size of government and the role of the state in the economy, encouraging private sector activity, can be done through restructuring and privatization of public enterprises, streamlining the regulatory environment for private sector investment, enacting the new foreign direct investment law, liberalizing labor laws, as well as minimizing impediment to the growth of small and medium sized private enterprises.

3.2 The current state of IT in Iran

Although OECD (Organization for Economic Co-operation and Development) defines ICT as a sector which comprises the manufacturing of information technology and telecommunication goods, the provision of information technology and telecommunication services, IT in Iranian economy is pertinent to hardware, software, training and maintenance, in computer networks [12].

There is not yet a declared official definition of IT in Iran. In the third development plan it is envisaged that the Secretariat of the High Council of Information (HCI) will undertake studies in order to provide a precise definition of IT in Iran. The council will also study the topics, factors and IT- related categories and fields with the aim of determining thrust areas where implementation of development programs could bridge the digital gap.

Neither is any clearly-determined responsible for IT industry and IT market in Iran. Arya Irani, mentions 26 different organizations that are responsible for IT affairs in the country in his article "one grape and 26 hungry men" in which the 'grape' is *the ICT industry and market in Iran*" and the 26 hungry men are the mentioned organizations [8].

Now, in order to have a look at the level of information infrastructures, let's have a look at some indicators regarding communication, broadcasting, computer, and the internet.

3.2.1 Communication

As regards to telecommunication development, the Middle East Economic Digest (MEED) reported that Iran was investing about 2.3 billion US$ per year in main telephone systems until the end of 2000, which has been the second highest in the Middle East and north Africa after Turkey [31]. Thus Iran was among the world's top five countries initiating telecommunication development.

Phone Lines
According to the Technology Achievement Index (Asia Pacific), the number of telephone lines in Iran was 12.5 per 100 inhabitants in 1999. The International Telephone Union (ITU) figures for 1995 shows 7.57 main telephone lines per 100 inhabitants. ITU's projection for year 2000 put this number at 17.03 per 100 inhabitants. According to The Statistical Center of Iran, this number has reached 28.5 per 100 inhabitants in the fall of 2005 [32].

Current total percentage of digital main lines is estimated to be over 85%. According to the Statistical Center of Iran, the number of installed main telephone lines was 10,699,408 in March 2001 of which 9,486,260 were in use including 7,815,181 in housing units, 1,243,512 in commercial and industrial units and 395,337 in public units. The above number reached 19,429,000 by the end of 2005 [32]. The diffusion of telecommunication had not been confined to the urban areas, 28,062 villages had joined the national telecommunication network by March 2001, of which 11,813 villages had long distance facility. But in December of 2005 it has had reached 46,630 villages.

Mobile Phones
The Iranian mobile phone network is based on GSM9OO standards. The network is managed by the Telecommunication Company of Iran. The number of subscribers of mobile phones in use had been 962,595 up to March 2001. By the end of 2005 it had reached to 8,015,000 users; resulting in 11.8 mobile phones per 100 inhabitants [33]. There are plans to subscribe more than 6 million new mobile lines by the spring of 2007, and also introduce the second mobile company in 2006 [34], which will raise the number of mobile line subscribers to more that 15 million users. The existing network was set up by Nokia, with a capacity of 300,000 lines in the early 1990s. The capacity was later improved by Alcatel to 450,000 lines. After another development contract

with Alcatel in December 1999, a contract with a Turkish company worth 35 million US$ was signed by the Iranian Telecommunication Company, then one with Ericson for an additional 350,000 lines as well as for network design, delivery of base stations and L switching connections.

New Satellite Mobile Phones

In 2002 an Emirates-based Soraya Satellite Company's agent who is in charge of the new satellite mobile phone project in Iran announced that distribution of a new generation of imported sim card and mobile phones will start shortly after the related software system's design completed and the distribution began in 2003. According to assessments, the price of new phones is about 1,000 US$, and the cost of using these phones is around 75 cents per minute. Additional fax, data and connection to internet will increase the cost to 1.25 US$ per minute. New generation of mobile phones will provide communication services to 99 countries.

Channels

Intercity microwave channels were expanded to 405,997 channels by March 200l. International channel assignments have also increased to 8.483 channels by March 2001. This means that more than 2,500 cities and towns in Iran can have access to international telecommunications.

Broadcasting

Bearing in mind the fact that according to the Islamic Republic's constitution, private TV broadcasting is not allowed, some quantitative development in the number of domestic networks and their international coverage was planned and implemented in 90s. IRIB (Islamic Republic of Iran Broadcasting) has six central networks covering government religious programs and also numerous other provincial channels covering science, education, movies, sports, cartoons and local current affairs; adding up to 15 local and international TV channels and 15 radio channels, which are all governmental [35]. The parliament banned satellite reception equipment in April 1995, but the ban has been enforced with varying intensity and almost nobody follows it.

TV Ownership

Though no official figures are available, it is estimated that there is one TV per four inhabitants.

Cable TV

No cable TVs exist, because no private TV company is allowed according to the constitution. IRIB, the governmental TV company, broadcast all its more than 10 channels on UHF and VHF channels for free.

3.2.2 Computer

First computers were imported to Iran in 1962. From 1971 to 1981 there was a hard competition for providing hardware and setting up huge software systems and training personnel. After the revolution, computing was an area that attracted considerable attention. Both hardware and software branches have been developed gradually. It should be noted that the effect of the U.S. embargo on Iran has made the acquisition and maintenance of powerful servers, work stations and satellite communication equipment difficult, if not impossible in certain cases.

Hardware Production

From 1981 till January 1998, 272 industrial permits were issued for the production of computers and its components; 48% of which was in Tehran. The mentioned permits were issued for the production of 3,102,700 units of computers, 251,500 units of printers, 514.300 monitors, 214,000 keyboards, 60,000 cases and 69,350 power supplies. The capacity of producing computers, which was 18,000 units in 1982, had reached 681,550 units by 1996/97. Later in 1997/98, 49 permits were issued for the production of 133,380 units of computers. It is estimated that the number of imported computers up to 1997/98 was 528,863 units. If we add the number of legally imported and also smuggled personal PCs to the above figures, the number might be doubled to 1.057.726 units by 1997. Despite considerable growth of the number of computers in use, no recent evaluation has been made in this regard; but estimates are about 800,000 to 1,000,000 machines sold annually.

Dr. Ghandi in his article named "Information, communication and technology and knowledge management in Iran" wrote: Iranian computer industry could be termed at best, as being paradoxical in nature. With the exception of specialized market niches dominated by brands such as Compaq, Sun and Macintosh, most computers in Iran are assembled inside the country. There are a number of computer parts supermarkets as well as specialized malls where a customer could have his/her computer custom built as he wishes, with the peripheral components such as scanners, printers, and monitors. There is a significant manufacturing capacity. Iranian Business Machines[35], for example, produces monitors and printers under license from Japan and Korea. Recently a 50 million dollar laptop production project was started in Kish Island. Investment will be provided by a group of Iranians residing in the USA. It is estimated that it will initiate in initiate 1,400 job vacancies. This also shows another aspect of the role that Iranian expatriates can play in the IT industry in Iran. According to the topic of this research, it is noticeable that investment in software production needs less money but more specialties comparing with hardware production.

Number of Computer Companies

544 computer companies were listed by High Council of Information (HCI) by March 2001. HCI put the total number of computer companies including those listed by this council, at 1,501 companies in 1997 more than 500 of which are software

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[35] This company has nothing to do with IBM and has been established after the US embargo on Iran by the members of the mafia families.

companies. The number of their workers was estimated to be more than 11,000. It should however be born in mind that the number of unregistered companies is much more than this. 78% of these companies were located in Tehran. Other centers of software production are Isfahan, Mashhad, Tabriz, Rasht and Shiraz. Some of the companies have received *ISO9001* and *TickIT* certification; and many more are on the way. Almost all of them use known methodologies, mainly structured and Object Oriented. The OO methodologies are getting popular; and frameworks such as .NET & J2EE are popular. Finally according to Magfa site all of them have tracks of successful projects[36].

3.2.3 Internet

The first link to the internet was established by the Institute for Studies in Theoretical Physics and Mathematics (IPM) in early 1990s. At the primary stage, the link was through the BITNET network and Iran's membership in Trans-European Research and Educational networking Association (TERENA formerly EARN). It later developed into a full-fledged internet link with the assignment of 500 IP addresses to the country and acceptance of Iran as a class C node [37].

Primary users of the connection were academics and research institutions, all being served through their own connections to IPM. Over the past few years, domestic Internet connections have grown very rapidly placing Iran among the top countries in terms of the rate of growth of Internet access, while anxiety about negative cultural aspects is persistent among the authorities. It was after 1994 that private companies started their activities as ISPs. Before that Telecommunication Company of Iran had made a futile attempt to set up a national information network.

Although there is only one Communication Company in Iran, and that one is governmental, access to internet is provided by Internet Subscription Provider companies or ISPs and not by the telephone company itself. Many of ISPs are private, but the biggest and most successful ones are related to the government. This diversity makes the services slower and with lower quality, as the internet equipments are not installed inside the telephone centres. It makes the data path twice longer, once from the ISP to the telephone central, and once from the central to the user and vice versa.

As a result of this disorder, access to internet in Iran is a burden. Until two years ago the only internet access method was dial up with its own limitations and problems. Now that the quality of the lines has improved and they function by far better than three years ago, lines are still noisy and dial up connection in still not reliable enough.

Internal Internet Connectivity
The infrastructure of Iran's internal connectivity is based on two major networks. One is the Public Switch Telephone Network (PSTN) to support connection based on modems. PSIN provides a connection for end-users to ISP's over mostly digital voice lines. The second major internal internet connection is provided by the Public Data Network (PDN) operated by DCI as an independent subsidiary of the

Telecommunication Company of Iran (TCI).

National Data Network

In order to provide a national backbone system, a plan concerning implementation of a national net-work called "National Data Network" was designed by the Telecommunication Company of Iran. TCI acts under the auspices of Ministry of Post, Telegraph and Telephoned (this name changed to the Ministry of Telecommunication and Information Technology).

According to the plan, the number of Data network users at the end of phase one (March 2002) would have been:

Internet users: 1,000,000

Intranet and VPN (Virtual Private Network) users: 1,000,000

Common users (both Internet and VPN): 600,000

Total number of end users: 1,400,000

Also, about 39% of the bandwidth was planned to be dedicated to Tehran, and the rest to the other cities. The main characteristics of the Data network are:

Providing Data network services in 420 centers in more than 180 cities

Providing necessary infrastructure for Intranets and point-to-point connection with a capacity of 7000 ports and with a speed of 64kbps to 2mbps with a covering capability of one million end users

Providing Internet services and national network IP all over the country with a capacity of 10,000 ports and a covering power of 1,000 ISP and one million end users

Providing more than 200 Asymmetrical ADSL ports with a speed of up to 8mbps in eight main cities for multimedia and live video services

Iran's IP-based public Data Network (upgraded IRANPAC) is currently in operation nationwide.

Satellites

To provide data communication services to both private and government sectors, satellite communications through two VSAT hubs have been promoted by the authorities as well. This was followed by a third hub and 850 VSAT terminals in the last phase with goal of meeting the needs of private businesses with high-traffic data communication application. But none of these services are open to public use as satellite receivers are illegal for ordinary people in Iran. In case somebody wants such a service, he can have illegal access to other satellites[36], but the price is not worth it, especially because the user is still dependent on a dial-up line for sending data.

Fiber Optic Cable Project

A fiber optic cable project which is a joint investment project with a foreign company was implemented in two different phases. The first phase with an estimated cost of 3,750,000 US$ was done in Tehran, and the second phase covered Isfahan, Shiraz, Mashhad and Tabriz. Flag Co., which started its activities in Tokyo, has already linked Tokyo to New York with a fiber link. The company laid 2.020 kilometers of fiber optic link between Tehran and Jask which was later linked to

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[36] It means that the embassies, banks, IRIB and other governmental organizations can use satellite receivers legally; and all other people must, and do use it illegally.

Fojaireh in UAE by submarine cables in 2005. This way Iran's National Fiber Optic Network was officially opened after 10 years of implementation on 10[th] of June 2005 [38].

Also another plan to link Abadan to Kuwait is under study. It is forecast that through Flagnet Iran is able to render transit communication services to neighboring CIS countries. It was also forecast that the implementation of the fiber optic cable project in parallel with Data services would result in an increase in the number of end-users, as well as faster access to internet and lower tariffs, by the end of 2004. While the number of end users has increased, and the tariffs for the ICPs were halved in 2005, they haven't felt the lower tariffs given to the ICPs yet because the expenses of data subscription is only a small fraction of ICPs' total expenses [39]. Up to the end of 2004, external internet connectivity was provided exclusively through satellite links. It was forecast that after implementation of the 18,500 km fiber optic cable project, the ISPs will increase to 10,000 and 18 million people will have access to the internet.

In case of fulfillment of the goals of The Fourth Development Plan, Iran will have 22 million internet users, and in that case Iran can act as the internet hub of the region [40]. This possibility is illustrated in figure 1.1 in chapter 1, page 4.

External Internet Connections
Until 2003, Iran's major external internet connections were as follows:
IPM (Institute of Physics and Mathematics studies)
DPI (Data Processing of Iran)
DCI (Data Communication Company)
IRIB (Islamic Republic of Iran Broadcasting)
MFA (Ministry of Foreign Affairs)
ISC (Information Services Company)
ISIRA (Information Systems of Iran)
Sirjan Special Economic Zone
Others
The number and bandwidth of external links has been growing during the past ten years.

High Speed Services
Iran uses the European standards for T1 and E1 [41]. It contains respectively 30 and 32 high-speed link cables and it is used only by the Telecommunication Company of Iran. In Tehran there were over 140,000 subscribers in 2002, and an additional 420,000 applicants were on the waiting list. Also 14 other cities were scheduled to have 170,000 lines.

ADSL lines have been in use from 2004, but the quality and prices are not satisfactory yet. It doesn't cover the whole country yet and it was expected to cover Tehran completely by March of 2006. It is also planed to give high speed internet services to at least 1.5 million Iranians by the end of The Fourth Development Plan [42].

So, generally broad band internet has come to Iran, in fact to Tehran and big cities, but it is limited and too expensive and with very low quality. Ministry of communication had promised that until the end of the previous Iranian year (1383

which ended at 20[th] of March 2005) they would have given ADSL lines in all parts of Tehran, but even now (April of 2006) their promise is not fulfilled completely and it is promised to be done by the end of this spring, which ends at 20[th] of June 2006 [43]. Those who have ADSL are not satisfied with its quality at all, because it is slower than its named speed, it has several cut offs, and it is very expensive (about 200 NKr for 64 and 128kbps up to 1000 NKr for 1Mbps and few thousand Krones (up to 3200 NKr) for static IP [44]. Worst of all, it is not reliable at all, and is extremely filtered.

In the recent years government has imposed a very strict filter on all internet lines to limit the access to data for Iranians. Although opener cards are available at about 10$ per month, this filtering has a very negative impact on the usage of internet in the country [45].

Anyhow, the quality gets better gradually and the filter becomes thicker. The reason that ADSL lines are not ready yet, is government's obstructionism. Government has allowed the private internet companies that many of them give dial up services currently (not all of them are private in fact, for example Pars Online is governmental), to install ADSL equipment and give broad band services; so many of them have bought such equipments. But the communication ministry doesn't give them a proper place to install them, neither inside, nor near telephone centers. So, those who are related to the government like pars Online, cover a wider area than the others, as well as they charge by far more expensive than others.

My own analysis on this strange procedure is that government tries to limit the flow of information into the country in order to keep the people unaware of the news and putting limitations on the internet, as much as possible, in according to this policy. Governmental companies have priority, because they are easier to control. But anyhow internet is opening its way into the country slow and steady.

The other possible way to access broad band internet is wireless broadband. Some of those ISPs that provide ADSL, have wireless equipments too [46]. In fact wireless was the firs broadband internet subscription in Iran, as it needs no cabling and installing its equipment is rather easier than cabled internet. Yet, its price is higher than ADSL lines and the covered area is very limited [47]. advantage of this system is its mobility and the ability to log in from different places, while logging in to an ADSL is not possible from anywhere else. Because each ADSL line is bound the ADSL modem that the company gives and the user ID and its password, none of them can work without the others.

The last possible method to have broadband and somehow reliable internet is use a receiver dish and subscribe a data service. Open Sky is one of the companies that give such a service [48], but there are few disadvantages in this method. First of all a receiver dish is illegal in Iran, although almost half of the people use at least one. The allowed monthly download and daily number of pages browsed are limited and the price is very high. For example it is about 40€ for 800MB/month and about 100€ for 2000 MB [http://www.broadsat.com/opensky/]. Also the user is still dependent on an unreliable dial up connection to send the data.

The Communication Company of Iran has announced that they have reduced the internet prices to half of it at the spring of 2005, but the end user hasn't touched it yet. Dr. Mohammad Suleimani, the Minister of Communication and Information Technology believes that it is ISPs' fault, as they pay half of the previous price for

their internet services, but charge the end user as much as before. He hopes that they can make it cheaper for the end user too in 2006 [49].

But I believe that the problem of internet's price in Iran is the big gap between demand and supply. While demand is always more than supply, users have to pay whatever the ISPs claim and the price won't have a sensible drop.

Saber Feyzi, one of the chief managers in the Communication Company of Iran, has said that fast internet with international prices will be available in Iran at the third year of the forth development plan, meaning two years later (2008). He has added that until Iranians consider IT and communication as something luxurious, the problem of communication and internet will not be solved in Iran. The fact is that the government is responsible to help developing the culture of usage of IT and then private section after that. Otherwise, imternet usage will be limited to E-mail and chat [50].

So, if the government really wants to make internet services cheaper and better and more reliable, they must increase wide band subscription lines, widen the band width, increase the quality of their lines in order to satisfy the users and prevent them of paying whatever price that ISP declares. While mixing the data services with the telephone central will lower the level of the lines' noise and increase the speed and eventually will improve the quality; as there is only one telephone company in Iran, it may result in lack of rivalry in the market and lower the quality and raise up the prices.

Finally, opening the filters will be a sign of government's good intention and its commitment to satisfy the user and giving proper services. Inversely, the government's strict intention to limit the information flow in any possible way, either software filters, or bad quality of the line or even prosecution of the weblog writers shows their intention to limit and control the flow of information. Under such conditions development of IT industry is very difficult.

International Stations

Iran's digital network is equipped with two international switching centers. The total capacity of the network was 23.250 main lines including 12,360 incoming lines connected to national network and 10,890 two-way lines in 1999. Iran had established direct and transit connections with 223 countries of the world through three satellite telecommunication centers (Shahid Ghandi, Isfahan, and Bomehen), undersea cables (Jask-Fojaireh in UAE), TAE fiber link systems, and land microwave network, at the time.

Number of Internet Hosts

The number of Internet hosts in Iran is estimated to be 271.

Number of Internet Users

Even though there are no official published figures regarding Internet usage in Iran, some unofficial [Shahriar Shahin: Managing Director of Sepand Computer Co.] estimates put the number at around 418,000, growing to 1,326,000 by March 2003. The estimated growth rate of the number of Internet users during 1996-2000 was more than 300 percent per year. Amir Taheri in his article named "Electronic war in Iran" published in "Alshargh Al Osat" [12] estimated that 2.2 million persons have access to

Internet in Iran.

Number of ISPs
Total number of ISPs was estimated to be around 300-500 in 2001.

Number of Coffee-nets
Currently about 500 coffee-nets are providing access lo internet for 2 US$ per hour. But coffee-nets are becoming more popular and their number is increasing continuously; so there is no official statistics or accurate estimations available.

Academic Internet Access
An academic internet access is available to almost all universities and research centers in the country. The national academic network was known as IRANET. The Ministry of Science, Research and Technology (MSRT) had pushed ahead the project to have Iranian Academic Network (IAN) fully operational and tested before the end of 2000. All universities and research centers have been included in this network. But student dormitories are not covered fully by this network. The network standard is TCP/IP and is essentially a combination of intranet/extranet. While most of IAN users can access internet, universities and research centers can modify their existing network as required.

Commercial Internet Access
Commercial Internet accesses are available through several Internet Service Providers (ISPs). The most important among them is the Data Communication Company of Iran, Neda Rayaneh, CompuServe, IRNET, Apadana, Virayeshgar and Pars Supaleh. Data Communication Company of Iran (DCI) is the arm of the state telecommunication company of Iran, which provides Internet access throughout the country. Various large governmental organizations such as the national Iranian Oil Company, Iran Air, Budget and Planning Organization of Iran, Ministry of Energy, with DCI's help have setup networks in order to communicate with their various branches, as well as attaining access to outside databases. An example of a DCI-assisted outside link is the Iranian central Bank which is now on the SWIFT network (Society for Worldwide Financial Telecommunication) with access to some 3,700 main branches of foreign banks. DCI is also offering CompuServe services in Iran.

Degree of Information Use
No published information about PC spending, PC communication spending, Internet spending, cellular phone and telephone spending are available. But according to IT experts, Iran is still far from having an affordable internet service. Although affordable is a relative term, it can mean about 150 hours of 56 kbps internet access per month for 10 dollars.

Actual cost of access to internet is about 10% of a normal salary, whereas it constitutes only 1% of the same in Europe.

Chapter 4: Methodology

In this section I am going to describe the scientific methods I have used to implement my research. The methods I am going to mention here are based on the methods used in qualitative researches which I have already studied among my courses. But first I will point out to Nicholson and Sahay's method used in their article on Iran's software industry in 2003 [3].

4.1   Nicholson and Sahay's strategy description

As mentioned in chapter one and repeated in chapters 5 and 6, this research is based on, and made following Brian Nicholson and Sundeep Sahay's article, Building Iran's Software Industry [3]. Although I consider my research as to be qualitative, and not quantitative of coarse, I found it useful to have a look at their method, mentioned in their article as follows. In the methodology section authors call their strategy as to be interpretive:

> *Our overall research strategy could be categorized as **interpretivist** guided by the knowledge of reality as socially constructed by individual human actors (Walsham 1995). An **interpretivist** approach tries to understand the perspective of different actors towards the IT situation in Iran, without trying to give the status of "truth" to one interpretation over another. Instead, the approach was to try and understand the multiple perspectives and why the interpretation of one person differed from another's on similar issues.*

As a matter of fact, I have also used the same approach, except that my focus is on the view from which the Iranians who reside in first world countries look at the network; as actors that have left this network. I am trying here to show the ways that they can come back to this network, even without leaving their present place of living, and share their sources with their homeland. Even it is possible to seek and mention the ways in which they are making further harm to the network of Iranian software industry, and mention them; in order to remind them at least stop to weaken the network that they don't strengthen it any longer.

For me, it doesn't matter if different people look at the same thing in different ways and from different angles, or even be in contradiction with each other; as long as they have no problem and do not struggle with each other. Every human actor in this network can have his/her own truth, but the same time work with the others and take a share in Iranian software industry, or at least as mentioned above, do not harm it.

So while I am not seeking to find an absolute answer for a question, which is the normal way to do a scientific research, I will try to give some recommendations on do's and don'ts. Every body can look at this results from his/her own point of view and agree or disagree with them, but what is important for me, is obtaining empirical results that have practical usage and value.

As my work is not a quantitative research I have no explicit numbers to get direct results from them; except once in chapter 2 that I have quoted few tables from Norwegian statistical institute, SSB. In fact this research can be basis of a quantitative work for checking the percent of different types of people that are mentioned or referred to them in here and some other numbers that are not clear in this thesis; and thus the practicality of the roles that are mentioned at the end of this thesis.

Contrary, I have used only qualitative methods, so it is very important to keep my neutrality against what I have found and what I result from them while I interpret my findings. Anyhow, I am already an Iranian and it is very natural that I have pre biases towards what is going on in that country. Yet, I have done my best to keep fair and as Nicholson and Sahay point out, interpret the role of each actor according to his own perspective, and not compare it with my own beliefs. In other words, despite I am myself concerned to a high extent with the main topic of this research and some other subordinate topics that are mention in it; I have done my best not to fake the data and the results, but to implement the research as just and unbiased as possible.

It is also noticeable that according to approaches mentioned in Creswell's book, I consider my approach towards this research as being pragmatic rather than other methods. Because comparing to what Creswell writes in the first chapter of his book 'Research Design' [51]:

- I am not committed to any system of philosophy and reality.
- I have freely chosen any method that best meets my needs and purposes.
- Truth for me is what works at this time.
- The problem is most important for me.
- And finally, I look at 'what' and 'how'.

4.2   Qualitative Methods description

In this section I will review the methods that I have used in order to implement my research and find the facts that I have written in this thesis. These methods are totally qualitative research methods, and I have tried to use them as correct as possible, in order to invalidate the results I get from them.

Also I have tried to overcome and disregard my personal bias as much as I could, in order not to deviate my analyses or the results that I extract from my findings. If ever I felt that I am not completely unbiased and I am getting the results that I wished from the findings, or I am extracting the data that I like, or leading the current of research to the path that I want; I have disregarded the case and revised it later again, in addition to reading and revising the whole thesis thoroughly for few times. So I

reassure the reader that this is the best and fairest I could do, despite the harsh accent I have had in some cases.

Here are the details of what I have done to prepare this thesis, including reading texts, direct observation, interviews, and corresponding with some Iranian it experts.

4.2.1 Books and Articles

A part of my studies in this research has been reading books and articles. As a matter of fact I haven't used so many books as the references of my research, but the several books that I have read here during my study years, have inspired me and shown me how to do the research. For example Jeoff Walsham's "***Making a world of difference***" [52] was one of them.

I have used one of the books that I have read on IT situation in developing countries to extract statistics about IT situation in Iran. It is a set of twelve articles about small IT enterprises in twelve different Asian countries published by Asian Productivity Organization in 2003 with the topic of "***Application of IT in Asian Small Enterprises***" [12]. I have extracted a part of needed information from this book, which were rather old, and added the information that I have got from other sources (mentioned in subsections 4.2.2, 4.2.3 and 4.2.6) about the last years to them and made the section 3.2, the current state of IT in Iran, in chapter 3.

As I have mentioned earlier and repeated later, the most important articles that I have read are works of Sundip Sahay, which I have explained in detail earlier in this chapter and will be reviewed in chapter 6, Literature Review; section 6.1.

4.2.2 Newspapers and Internet News Agencies and TVs

I have read a large number of newspaper articles relevant to the general topic of IT in Iran or other countries, at least three every day during the last few years; as I have spent few hours daily to review newspapers and news websites during my residence in Norway.

Although I haven't used most of them in this thesis, the general information that I have used in most parts of this thesis is extracted from these news sources. In addition, still a large number of references point to these news articles which have been mostly from the following newspapers or websites:

- Kayhan newspaper of Tehran *http://www.kayhannews.ir/*[53]
- Kayhan weekly of London *http://www.kayhanlondon.com/*
- Hamshahri newspaper of Tehran *http://www.hamshahri.org/*
- Iran newspaper of Tehran *http://www.iran-newspaper.com/*

The first four ones are ordinary newspapers from which I study economic and technologic parts from their online versions. The fifth one is IT News Agency that puts detailed news Iran's IT every day on the net and the sixth one is the official news website of MAGFA.

- ITNA *http://itna.ir/*
- MAGFA *http://newsletter.magfa.com/main.asp*

Also the following site puts the programs of an Iranian satellite TV network from Los Angeles on the net; from which I have got economical and political information.

- AFNL *http://www.afnl.com/*

All above sites are in Persian.

4.2.3 Relevant Websites

All software companies have official websites that explains a lot about their activities and can be referred by researchers like me who want to get information about their works. But unfortunately in case of my research topic, they had not much to present. Yet I have used few of them to introduce to their activities and their staff in order to correspond with them and ask about their relationship with relevant diasporas of their country; with almost no response. A more detailed description comes in subsection 4.2.5.

In the same way, all other companies and organizations have specific websites; from which, few Iranian governmental organizations helped me a lot.

Also, I have used few other sites to obtain statistics or other information about Iranian diasporas around the world. The following examples are among those that I have used:

- Arsham Koosha software company in Tehran *http://www.arshamkoosha.com/*
- Computer World online magazine *http://www.computerworld.com/*
- Iran Trade Point Network *http://www.irtp.com/*
- Iran trade Promotion Organization *http://www.tpo.ir/*
- International money Found *http://www.imf.org/*
- NASSCOM *http://www.nasscom.org/default.asp*
- Persian Investors *http://www.persian-inventors.com/*
- S.O.S. Iran (the Movement of Tomorrow's Iran) *http://www.sosiran.com/*
- SANARAY Software Export R&D Co. *http://www.sanaray.ir/*
- TAKFA National ICT Agenda *http://www.iran-ict.org/Portal/*

4.2.4 Interviews

Actually the most important and useful tool in my research has been interviewing to those IT experts whom I knew in Iran or Norway and one in US, one in New Zealand, and one in England. I have totally interviewed with 16 people that four of them were non-Iranians, all in Oslo. From the other twelve, six were in Norway, Three others in Iran, and three in New Zealand, England and USA. Generally my interviewees helped me very much, as either their work is in direct relation with my

thesis' topic or they are involved in a way in related activities. Every single person showed me a new angle that others didn't mention it.

I have also contacted eleven others in Iran, Norway or US that they either didn't give much help or didn't interview or even didn't answer my message at all. Any how, as a total problem, interviewing Iranians is in a way difficult because of the following three reasons:

1- As a very large part[37] of economic activities in Iran and/or with Iran is rather illegal and involves a kind of corruption[38] or underground activities [54][39], the actors in this network avoid expressing the facts of their job formally. Even if you ensure them that all information will be kept safe and no name will be published, still this belief is overcoming that "Don't fix it if it is not broken".

2- Iranians generally, and those who reside outside the country particularly, are afraid of the government lest they become arrested or get into trouble because of something they have said. Thus, they don't rely on somebody who is not familiar to them. Especially, those who go to Iran and come back regularly are very careful when they encounter a stranger who wants to ask them strange questions, in order not to have any trouble during their residence in Iran, particularly at the airport.

3- Nowadays Iranian expatriates are divided into too many different political groups and none of them confides in the others. Even those who are politically neutral, are normally afraid of all others and many of them avoid each other.

The above problems make it very difficult to make a formal interview appointment with anybody and it is by far so much easier to gather any kind of information during friendly informal chats. But this solution needs previously known contacts; and obviously my network is not strong enough here in the Europe to follow this method.

All interviews in Norway have been done through face to face talking. But in case of the others, I first initiated an appointment by sending the interviewee an E-mail, and in case of positive respond, followed it by telephone or online chat or few more E-mails. Despite that this procedure was rather difficult to follow and in some cases took over a month to complete, all such cases were the most useful and relevant ones.

Most of my interviewees were my own acquaintances, but I found two of them with the help of the cultural attachment of the Iranian embassy in Oslo. Of course, I requested to meet the economical attachment at first, but he had nothing to do with IT industry and software export, but he introduced me to the cultural attachment, and this one knew only tow Iranians in Norway that their job is in relation to IT, from which only one was relevant a little bit to my topic.

A detailed and rather complete description of my interviews is presented in chapter 7, discussion and analysis.

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[37] This part is estimated to be more than one third 54.   Amoozegar, J., *The Underground Economy of Iran*, in *Kayhan London*. 2003: London..

[38] Such as bribery or smuggling or breaking USA's embargo … etc. Last year's scandal of Stat Oil on bribing Hashemi's son to win an oil contract is a well known example of this problem.

[39] This one is mainly in order to escape tax and custom taxes.

4.2.5 E-mail Corresponding

One of the methods I have used in order to gather information from those people that I had not near access to them, was sending them an E-mail; either to get a short answer or to introduce a longer connection. But after a few messages I understood that I repeat few questions from every person, mostly about their personal identity and characteristics. So, in order to make my work easier, I prepared the following template for my E-mails to ask the receiver few common questions. Of course, in each case, according to the job and position of the receiver, I modified this message:

Dear Sir/Madam (or) Dear Mr. X

I am Farhad Zoljalali, master student of informatics at the University of Oslo. [I have got your Name from my supervisor Mr. Sundip Sahay.[40]] The topic of my thesis is: "The role of Iranians who reside out of Iran (Diasporas/Expatriates) in the development of the Iranian software industry." You can see Mr. Sahay's web page at: http://folk.uio.no/sundeeps/ and if you click on Supervision you will find my name there.

It would be very nice of you if you kindly answer questions attached to this message or whichever that you can/want (I don't expect that you put too much of your time on my request, even a very brief answer will be a big favour).

I remind you that your name and your company's name won't be mentioned in my thesis; I will use surnames, or even won't point out to you and your answers directly if you prefer.

For your convenience, I have attached my questions as a word document that you can write your answers in the same page and return it to me.

I will also be very thankful if you introduce me any kind of sources or materials (article, webpage, book, etc. in relation with my thesis topic) that you may remember.

I am waiting for your kindly reply and Thank you very much

Farhad Zoljalali

Of course I didn't send the whole message for everybody, but trimmed it according to the case as mentioned above. In first messages there was no attachment. A few questions where added at the end of message as following:

A- Can you please introduce yourself a little bit at first?

1- Sex: male   female
2- Age:
3- Education: Bachelor   Master   Doctor
4- Permanent Residence:

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[40] This sentence was added only to those whom Mr. Sahay had introduced to me. I some other cases that they didn't know me already, I introduced myself according to the case.

5- You work at: University   Software Company   Else (please mention)
6- The name of above institute (for my own reference only)
7- Your position at the above institute is:
8- Your field of specialty:

B- Is there anything that you want to remind about your institute?

C- Are you aware of any projects in Iran that Iranians in other countries have a major role in that project? If yes, do you work in that project yourself?

D- Can you write your own opinion about the roles that Iranian IT experts in other countries can play in Iran's software industry and the problems in this way?

E- Do you have any other comments for me?

But I got almost no answers from these messages. So I decided to ease the receiver's work in order to encourage him to reply to my questions. So I separated the questions part and put them in a .doc file that was easier for the receiver to fill in and send back; and attached the file to the main message.

The following questions are those attached to the message that I mentioned above and pointed out to them in the message. But first, it is very important to remind that this short list of questions was in no way intended to act as a 'questionnaire', because it is far shorter and simpler than to be called a questioner or used as one. Also, my intention hasn't been to gather data from numerous people through this form, but it was used in the first place to introduce the receiver with the nature of my thesis and my work and in fact establish further contacts with them; and make them ready for an online (telephone or internet) interview. Here it comes:

Sex

Male	
Female	

Age

20-29	
30-39	
40-59	
60+	

Education

Bachelor	
Master	
Doctor	

Work situation

University	
Software Company	
Else(please mention)	

1-Your position at the above institute is:

2-Your field of specialty:

3-Is there anything that you want to remind about your institute?

4-Are you aware of any projects in Iran that Iranians in other countries have a major role in that project?

☐   **Yes**

☐   **No**

If yes, do you work in that project yourself?

5-Can you write your own opinion about the roles that Iranian IT experts in other countries can play in Iran's software industry and the problems in this way?

6-Do you have any other comments?

Thank you for your time and that you answered this questionnaire.

This one got few more hits (more than zero I mean), but still les than what I expected. In sum, email corresponding was only successful with those who knew mw already, and it didn't work with those to whom I wanted to establish a contact for the first time. Even in few cases that such people replied to my message, finally they didn't give me much information, may be because lack of trust.

4.2.6 Statistics

In few occasions in chapters 2 and 3 I have given quantitative information that I haven't gathered them directly. In fact I have extracted most of these information from statistical organizations' websites, news agencies and in one case in chapter three from a book. The following web sites are those that I have used them more than others:
- Statistical Center Of Iran *http://www.sci.org.ir/*
- Statistics Norway (Statistisk Sentralbyrå) *http://www.ssb.no/*

4.2.7 Direct Observation

As an Iranian, I have used a good deal of my own direct observation of what has happened and what is now going on in Iran in different parts of this research, particularly in chapter 2, "Why Iran has so many diasporas" and in case 12 on BIHE in chapter 7, case description and analysis. I have also used my own information in many other places of this thesis; yet as I have used many other sources and opinions of many other people in preparing this paper, using this amount of my own observations doesn't bother the research identity of the work at all. Moreover, as I have lived in the place for more than 30 years and observed many different aspects of historical, political, social and technological changes in that country, I have considered my own memories a valid source to refer to and citing, at least not less than opinions of those with whom I have interviewed.

On the other hand, the process of producing software and what some particular people do during that process, has not many mechanical actions to be observed directly, and is more abstract rather than physical. So I could have not used direct observation technique more than what I have done. Because, generally software producers think about something and put the result on paper, or implement it on their computers. The role of some people outside a determined country is even more abstract than that. So, in fact we should observe these peoples thoughts rather than activities. Thus, in order to observe thoughts, you can not watch something; but you have to talk to people who own those thoughts and/or read their writings and/or observe and analyze the effects of their activities; which I have did to a high extent.

Chapter 5: Theory Overview

As mentioned earlier, the main article that is basis of my research is: "Building Iran's software Industry: An assessment of plans and prospects" by Brian Nicholson and Sundip Sahay [3]. So it is most natural and useful to use the same theoretical basis of that article as the basis of this research. I have also reviewed this article in chapter 7, literature overview.

The theory model used in the above mentioned article is called the "Software Export Success Model". The authors have proposed it as the "Theoretical Frame" of their research. We see the model in figure 4.1:

International Market Demand for Software

International Linkages

Trust

National Software Industry

Clusters   (Competition)   Collaboration

National Software-Related Infrastructure

People   Technology   Finance   R&D   Other

**National Software Vision/Strategy**

Government   Industry
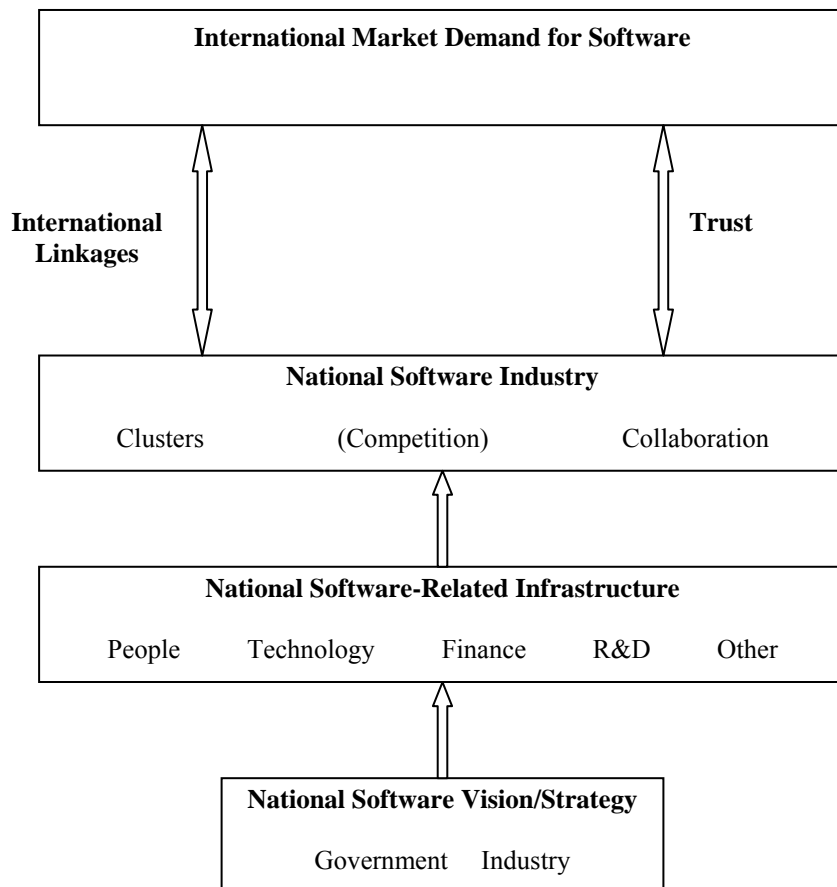
Figure 5.1: The Software Export Success Model

The authors explain that this model: "*…reflects their respective empirical experiences and associated academic and practitioner literature on the "first tier" software exporters, the Indian, Irish and Israeli software industries or 3I s. This process enabled common factors to be derived which were grouped into categories considered central to the development of success of these three countries. The model was then applied to three "second tier" nations: Russia, China, and Philippines.*"

Thus, in order to follow the same pattern, I try to apply this model to Iranian software industry characteristics here. Also I have tried to apply the same theory to my other findings in this thesis and compare them with, and discuss them on the basis of this model.

According to Nicholson and Sahay, Software export success model has five categories: "demand for software, national software vision and strategy, international linkages and trust, national software industry characteristics, and national software-related infrastructure". The authors have discussed each category briefly, but I skip that part and only compare them with the characteristics of present Iranian software industry and political and economical situation.

The first category which is located higher above all is "demand for software', at which I think Iran has no problem. Almost all Iranian Diasporas with whom I have interviewed, have declared their ability or at lest their wish to outsource Iranian companies and initiate software commercial dealings with Iran, or give any other services that they can to the Iranian software industry; provided that the problems be solved first. Foreigner companies also desire to get low price services from Iranian companies, but they have more hinders rather than their Iranian counterparts. I will explain these problems in detail later in chapter 7, but let's mention here that the most prohibiting one is the American Embargo on Iran.

By the simplest estimation we can consider that the world is going towards developing IT systems and services, so the demand for software will grow up in the coming decades, thus Iran can have a good share of this expanding market if its rulers take up proper policies.

The second category, which is the most critical one in case of Iran as I believe, is "national software vision and strategy" at the very bottom or in fact the foundation. The week results of Iranian software export plans along with international tensions and many other problem, show big problems I this area. Although Iranians have already designed two national IT plans, TAKFA and TAKFA2 [55], and they have established Sanaray to develop software exports [41][56], the pure fact that Iran has gained no sensible progress yet, while pioneers like India are doubling their income through software export every other year, shows that Iranians policies have not totally been correct and their efforts has not worked as expected.

If we compare Sanaray with the organizations that were established in 3Is, like NASSCOM in India and others in Israel and Ireland, we easily notice that in those countries all other organizations have had the same direction; or at least if they didn't cooperate with them, they didn't bother and hinder international trust too. In case of Iran, while Sanaray is formally responsible to export software, the total policy of the government is to weaken international bonds and make tensions in the whole world;

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[41] Sanaray is in fact established by private sector software companies, but governmental sector has also a part of its share.

which is in obvious contradiction with a vision on any export plan, let alone the software.

The government should also prepare accommodations for software export in the Iranian embassies in developed countries. Once I had gone to the Iranian embassy in Oslo to ask them about Iranian software experts in Norway, I also asked them if there are any conveniences for export software from Iran, or even import software and IT products to it. But much to my amazement the answer was that their work in embassy is limited to oil and few other important items; and IT cases are so rare that nobody knows about existent regulations and limitations and conveniences. In fact they have no preparation to give any kind of service In relation to software export from Iran. The economic attachment only introduced two websites to me In order to find the answers to my questions in them.

Now, in April of 2006, we are waiting for the UN's Security Council to put rigid punishments on Iran. The new government is trying to make the country's relation with the rest of the world dark and critical, and of course this hinders development of exports; regardless of whatever that the responsible organizations do. As I mentioned before, despite the formal efforts of Khatami's government to recover the relationship with the west, the present government openly tries to make and signify tensions, and worsen all foreign relationships. Iran's four major issues, the nuclear program, terrorism, disturbing peace in the region and disturbing human rights, hinder all efforts to establish good relationships with first world countries.

This growing tension, directly affects on the third category which is international linkages and trust, and I described the impact of government's bad policies on these two factors that have most to do with the diasporas. Although the topic of this research is the role of diasporas in the Iranian software industry, I have to claim that the government's behavior and most above all the new president's "outrageous claims" [57] has in fact paralyzed them for the time being and I most of the recommendations that I have, are only valid and possible to implement in absence of such a government.

Anyhow, the experiences of successful countries and particularly 3Is, shows that diasporas' role has been critical in this category:

> *International linkages were also key to the development of the 3Is which refers to making and sustaining linkages with markets and customers overseas. The Diaspora was critical in forging ties between firms in the home country. Linkages were also built through marketing operations set up by industry associations such as India's NASSCOM. Another issue is trust which was facilitated by the diasporan links and by the reputation of famous companies such as Microsoft or Intel who set up subsidiaries.*

Once Iranians change their 'world-confronting' methods and settle down their international tensions and recover 'international linkages' and gain more 'trust', their powerful Diaspora can play a very good role in connecting the two sides to each other.

Forth category is national software industry characteristics. According to the low level of IT services in Iran and lack of nationwide IT infrastructures, it seems that the Iranian software industry hasn't done its job well enough even to respond the internal needs of the country, let alone exporting software. It is roughly estimated that comparing with international prices Iran needs about 10 billion US$ per year software

for its own internal usages in the next decade[42]. Yet, IT section in Iran has also many power points, and exporting software will make them more powerful, that makes it more noticeable and worthy to invest on[43].

First of all we should remember that the private IT sector is not to blame for the lack of IT development in Iran. Consider that in absence of helpful government, correct policy, proper infrastructures, great investments and most above all skillful human resources, even IBM and Microsoft might be nothing more than small enterprises today and America was a non-developed country like Iran and Iraq today, according to IT industry. Iranian companies are in a real shortage of all abovementioned primitives to develop their national IT industry.

But as for the power points, let's first look at the power pints of 3Is according to the authors' point of view:

> In the 3Is, clusters forged competition and collaboration between firms using world-class telecommunications. Knowledge transfer and other synergies provided by clustering were also key success factors. Availability of skills and the cost of labor as well as English language skills were also important.

Iran has a noticeable work force, but the problem is that the more one is skillful, the easier he/she can immigrate to first world countries. So in terms of 'availability of skills', I have to say that skillful work force is abundant in Iran, particularly in the last decade the number of university graduates has grown up so fast, due to establishment of the numerous low quality universities all around the country. But the Islamic regime scatters them as soon as they pass an acceptable threshold, with a rate that is faster than producing them. So the quality of education in Iran goes downer every year in comparison with the previous year. In the same way, there is not enough time for the new generations to acquire skills and experiences of the more experienced generations before they leave the country. This problem is most critical in IT field, as IT technologies become obsolete every decade and university texts and methods must become updated every semester. Particularly, project management is a skill that must be thought and transferred via face to face cooperation.

It is obviously a too great expectation from the Diasporas that they go back to Iran and work there before a fundamental change in the conditions of their homeland. This fact magnifies the role that they can play and their duty in educating new generations and training the working human force and transferring the knowledge; because it involves a kind of sacrifice that almost none of them is ready to do. A detailed discussion on the role that diasporas can play in remote education and training comes in case study 12, the experience of BIHE in chapter 7, analysis.

The problem is exactly the same in case of "English language skills". Although many educated Iranians know and learn English language very good, most of them intend to use their ability in seeking better life and opportunities in developed

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[42] One of my sources for this estimation is Dr. Zarei; to whom I interviewed. Look at case 5 in chapter 7.

[43] According to the nature of this research which is finding the ways in which Iranian expatriates can improve Iranian software industry; most of the focus of this study has been on the shortcomings and problems. Thus, unfortunately, the positive points have less contrast. If this thesis was trying to describe the characteristics of IT and software industry in Iran, then it was easier to look at positive and negative points to the same extent.

countries. So again, the skillful foreign language speakers turn into diasporas when they pass an acceptable threshold. Again we encounter the role that diasporas can play both in connecting Iranians to the foreign markets, and in training the human force.

Low cost of labor, which is Iran's biggest priority, goes under veil because of the dark political relationship between Iran and America. While the average income of IT experts is at least one tenth of that of Americans, it is no big deal for American outsourcers because of the US embargo on Iran. American companies can not work directly with Iran, and if they accept all problems and risks, and work with an Iranian staff through a mediate company in some other countries, the resulted overheads cover all the difference and spoil the potential opportunities that Iranians could have had. Even in case of fundamental changes in Iran and melting the ices between the two countries, the labor cost in Iran will rise up gradually and decrease the contrast, I believe. Thus this priority is in fact spoiling.

Anyhow, the strategic situation of Iran both in the Middle East and in the world, and also the big number of university graduates in IT inside Iran, and finally the big number of IT Iranian experts spread all around the world, are so high potentials that although are not exploited properly yet, promise such a bright future for the Iranian IT industry that researchers, investors and outsourcers can not ignore it.

Moreover, the new market of IT which due to lack of developed IT applications (like those applications and usages that we see in developed countries) has a very large space to expand and grow up, strengthened with the numerous and ever-growing IT users; is another guaranty for the profitability of investment on IT and software industry in Iran.

Finally we reach to the category of "national software-related infrastructure" that is still too weak in Iran. I have written a good deal about the current situation and IT infrastructure in Iran in chapter 3, current situation; so I skip it here.

Chapter 6: Literature Review

In this chapter we will review the texts that I have read them to write this thesis. Few of them have been works of Sundeep Sahay, which I put them first, and then I review other books and articles.

6.1 Sahay's Works

The importance and priority of Sahay's works or and common works is in this fact that I have based my research on his works; and in fact I have chosen my research's topic from the two articles that I discuss them first, as follows.

6.1.1 Nicholson and Sahay: "Building Iran's software Industry: An assessment of plans and prospects" [3]

This article is the main text that my research is based on it. It is written by Brian Nicholson and Sundeep Sahay. This article is the report of their travel to Iran in October 2002 in order to observe the country's IT situation directly. Although they have given some recommendations at the end of their article, actually this article is the report and analysis of what they have seen in Iran. Although this article has not much to do with Iranian Diasporas, I begin with my own review of it according to this study's point of view and try to express my own analysis on it and relate it to our own topic; because this article is the main text that I have began my research with.

The article begins with the authors' reminding that Iran's software industry has 'some high level potential in some regional and international markets'; yet few problems have inhibited the country of being mentioned among giant IT exporters. They point out to the following major problems:

1. Regional and domestic instabilities
2. The USA imposed trade embargo
3. Outdated technologies
4. Lack of international quality standards
5. And finally 'endemic piracy'

According to the first mentioned problem, regional instabilities, following news related to Iran on TV and internet has shown to me that 'regional instabilities' (I mean

instabilities in neighbouring countries and Middle East) are not the major problem. In fact instability inside Iran –let's say domestic instability- is so high, that all other problems in neighbouring countries seem to be of less importance in comparison with that. Many political analyzers believe and claim that Islamic Republic is responsible for many problems in the region, so calmness in Iran may make the whole region calmer and more reliable and more stable.

If we look justly, we see that two of the biggest giants of IT, India and particularly Israel are located in the same region and they have also some domestic and regional tensions and instabilities too, particularly with their neighbours. What prioritizes them over Iran is their internal stability and democratic atmosphere that has enabled potential forces to grow up and show up so successful in the international fields. If Iran has become one of the most unreliable countries to attract foreign investments [23], it is because of its own internal instabilities and tensions that make everybody, either native or stranger, to escape from Iran and avoid it. Almost nobody will cooperate with a member of 'the axis of evil' until that country exits from the black list.

The second one, USA embargo is the mother of many other problems, including the other three problems that are mentioned here by the authors. We can understand the importance of this problem when we read in this article that in case of India, "*the bulk of demand comes from the USA … and to a lesser extent … from Europe.*" Also we should remember that USA is the centre of many –if not all- technologies and cervices that in order to have access to them, one should have good political relationship with US as well as international good fame. But unfortunately the current Iranian government lacks both of them. As a very simple example we can mention UNIX servers that are illegal to enter Iran from both American and Iranian sides (look at cases 2 and 3 in chapter 7 for a detailed discussion on this). United States is also the centre of investment. Any country who wants to attract foreign investments should have acceptable foreign relationships, particularly with America. Continuing the list of technologies and cervices needs a separate study and this section doesn't afford that.

While the first two problems need a very deep and foundational change in the system to be solved, Iranian Diasporas can play an outstanding role in order to solve the second two problems. I will have a more detailed discussion on this at the last chapter. The fifth one requires improvement in the law and establishment of a powerful copyright low in the country to be solved.

Another point mentioned by the authors is the Iranian government's hope to reduce the brain drain of Iranian young, low cost highly educated people by a strong software industry. In fact the relationship between the Diaspora, brain drain, and the IT industry is like a closed circle. It means that when the IT experts -or brains- escape the country and change into Diaspora, the IT industry of the country becomes weaker and weaker everyday. This in turn makes the new generations of experts and elite classes to be attracted to the well ordered and comfortable foreigner communities that owe a very high degree of their comfortable lives to the progressive IT infrastructures in their countries.

Reversely, if Iranians develop electronic government in their country, and make people's lives more comfortable and more ordered, not only they can prevent the highest degree 'brain drain' of the world which is happening in their country, they can

also attract the Diasporas to come back to the country and help to promote and develop the use of IT and its culture in their homeland.

I remind the reader the pyramid of population texture that I used in section 2.4 of chapter 2; and the emigration of elite groups from the top of the pyramid. Now consider a pot that contains boiling water and is heated from the bottom. If we cover the pot's top, the temperature in the pot rises up steadily, proportional to the heat that we give to the system. But if we leave the pot's top open, hot groups of water molecules come up from the bottom as bobbles and finally evaporate from the surface. Thus the temperature of the pot won't pass the threshold at which water evaporates. This way whatever heat that you give to the system, only evaporates more water and gives no higher temperature to the pot itself.

We can consider Iran as that pot, and education as the heat, and the elites of the community as the evaporating molecules that escape the pot. In prosperous countries when people graduate, they generally stay there and push forward their own community. But in third world countries a big part of educated people immigrate to developed countries and this phenomenon slows down the growth. In Iran, the rate of evaporation, or immigration, or brain drain, is the highest in the world and doesn't allow the country to develop as fast as it can do. The high growth rates that statistics show is due to oil incomes. If Iran had not the highest rate of brain drain in the world, it was able to experience much higher and more sustainable growth and development rates.

The other point that attracted me in this article, was the writers' pointing out to this fact that "Iran is largely unexplored in the information technology literature". This fact is one of the points that few of my interviewees also remind that. For example Dr. Behrooz Zarei, the manager of the electronic government project in Iran, reminds that there is very little strategic research on IT issues in Iran. Shahram[44], who is implementing a research on Iranian diasporas in Norway and the media as his doctoral project in the University of Oslo, also reminds that he has found nobody in Iran to do a serious research project. He was very dissatisfied that he had found all noticeable researchers only outside Iran. I believe that one of the most important duties of the Iranian IT experts in the international research centres and universities is doing more strategic research on the issue of IT industry in Iran. Another proof for the lack of IT researchers in Iran, is inviting the authors of this article to Iran in order to implement their research and write this article. It shows that there are no experts like them in Iran. This item is one of the roles that are mentioned in chapter 8, conclusion.

In another part Nicholson and Sahay claim that "*Iran ... is largely unmentioned in the global IT domain and is reported mostly on its political development.*" As an Iranian, I have to say that the political atmosphere of our country has gone centuries backward during the last three decades and all the abovementioned news have been nothing but fail propaganda and wrong promotion. In fact, if Iran had undergone political development, it wouldn't have the highest rate of brain drain and eventually it had a better reputation in the international IT market; let alone Iran's reputation in

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[44] I haven't included my interview with Shahram in chapter 7, as it was very short and the above quotation is the most important point in it.

international relationships. Also it shouldn't have become the 88th country to attract foreign investments [23]. The new president and his government's behaviour and talks confirm my claim on lack of political development and return backward in the time.

Also lacks of "*public domain information about the IT industry*" and "*difficulty of getting statistics and details*" that are stated in the same article are other hallmarks of closed political conditions and lack of development in information area. Notice that eventually more information means more awareness, more criticism, and more unrevealing of the weak points and corruptions; and in one word it means more thinking. All these are in complete contradiction with the benefits of the current rulers of Iran; so they have to limit information in whichever way that they can.

As another witness, we can look at the 3Is that all have democratic regimes and all other eastern European and other countries that Nicholson and Sahay believe they are 'emulating' 3Is, have recently experienced a good degree of democratization and political development. For example, India is the biggest democracy on the Earth.

Another paradox that authors have quoted in their article is this sentence:

> "*Iran is an Islamic republic, with an Islamic constitution and legal system run according to 'Sharia' law in which the clergy officiates as judges but the country is a republic and a democracy.*"

Although this matter is not in direct relation with our discussion, it is necessary to remind that governance of a particular group, even though a majority, is in complete contradiction with democracy; which is supposed to include all groups of a nation regardless of their colour, language, race religion and belief, to the same extent. Now that in Iran the rulers are fanatic and fundamentalist, the country's system is too far from democracy and it is obviously a dictatorship and fascistic regime.

In order to understand why 'brain drain' is so serious in Iran and what is the feeling of Iranian diasporas towards their country, it is important first to make clear that it is impossible to have a 'republic' and 'democratic' system that is based on a particular ideology, and make it clear that the expression 'Islamic Republic' is nothing more than a disastrous fallacy. Almost all Iranian expatriates love their country and wish to go back there or at least give a service to their homeland. But it is impossible for them to live there under the current conditions, and very difficult to cooperate with the country's system; because the ultimate decisions are made by clergies and not technocrats and experts.

As a very obvious witness we can compare these two sentences written in the article not far from each other. The first one is quoted just a few lines ago:

> "*…and legal system run according to 'Sharia' law in which the clergy officiates as judges…*"

And the second is about India:

> "*Furthermore, anti-piracy measures and a legislature that can be relied upon to adjudicate fairly also facilitate trust. India's legal system based on the British system provided some level of reassurance in this respect. The software export success model suggests strategy should be focused on creating a climate conducive to foreign investment.*"

As we see both important conditions mentioned in this quotation are missing in Iranian Islamic system:

- While authors recommend a legislature that can be relied upon to adjudicate fairly and facilitate trust, Iran's legislature has shown to be unreliable and unfair. The current situation of Iran is the best witness of this claim.
- While India's legal system, for example, is based on the British system which has a worldwide honour and has proved to be modern and efficient,\; Iran's system is based on fanatic ideas of a limited group of clergies.
- The placement of Iran at the very bottom of the foreign investment reliability table [23] is the best proof that Iranians' strategy has been on of the most wrong strategies in the world.

Another witness of the wrong strategy is *"the amount of negative reporting on Iran"* that the authors were 'struck' with and mention it as the second important problem after lack of information and statistics. It is implied in the article that diasporas are the best and most powerful force that can "counter this negative image" as the authors point out their critical role in establishing international linkages and trust, provided that the atmosphere cooperates with them. Iranian immigrates are one of the most educated and successful minorities wherever they are and have a very good reputation [58]. But the problem is that the Islamic government and its attaches don't let the Diaspora to gain and transfer that reputation to their homeland; as they do a new embarrassment every day.

Just now the Islamic republic in confronted with four major issues that international authorities try to condemn this regime for them: the nuclear issue, involvement in international terrorism, disturbing peace in the Middle East and disregarding the human rights. The new president makes the situation worse every time he opens his mouth. Right now that I am writing this lines, his most recent claim is this: "We want to control the whole world from Qom[45] and this is our duty[46]". Thus we see that whatever the Iranian Diasporas do, they can not buy any reputation for the current regime; and their first duty is to convince people of the world to discriminating between the Iranian nation and the Iranian government, which is a very difficult task.

In another position we read the authors' pointing out the liberalizations that happened during Khatami's presidency, in order to reduce reliance on oil revenues. But eventually, as it is stated in the article, this trend led to failure due to several reasons; and most above all disagreements from a part of fanatic and conservative actors of the Islamic government. Authors state that:

> *"This drive to liberalization has led to polarization of the conservatives and reformists in Government causing tension and uncertainty about which course the government will take."*

But all analyses on the history of the Islamic Republic show that these two wings have been existent in the Government long before Khatami's election and even from the time of Khamanei's presidency in 80s.

The issue that made the two wings of the regime stand in front of each other, was not reforms and liberalization; but it was the old will of conservatives to acquire the

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[45] Qom is a religious city in the middle of Iran, which is also the biggest Shi'e clergy training center in Iran.
[46] He means that they must convert everybody in the world to Shi'e Islam; and then Qom will be capital of the world!

monopoly of power, and they only found a good reason to do what they wanted, when Mr. Khatami began his liberalization programs. So, Khatami's efforts only transferred the war of power in the Islamic Republic to a new period, but did not split the government; as it was already a bipartite structure.

Conservatives were afraid of losing their complete power as result of following the pattern of the Soviet Union and witness the fall down of the Islamic Republic after enforcement of the liberals and reformists. Even at the beginning of Khatami's reign many analysts compared him with Gorbachev. So they did whatever they could in order to reverse the current that Khatami had initiated; and succeeded in their will completely. After election of Ahmadinezhad, they celebrated the death of reforms and reformists.

In fact *"tension and uncertainty about which course the government will take"* has always been a characteristic of Islamic Republic; and a good witness for this claim is Iran's low level of development despite its abundant natural wealth and oceans of oil and gas and tens of millions of young and educated human force.

In addition to the gap in views and political goals of the Iranian politicians, we can mention following two reasons for the defeat of reformists' efforts in liberalization:

1. The innate corruption in all systems in Iran, turned 'privatization' into mafia's share distributing ceremony. Governmental companies that were confiscated from their owners at the early years of revolution, or established later by governmental assets, were mostly sold to corrupted members of mafia families at very low prices[47]. The new owners that are not necessarily real technocrats and good managers can not satisfy the goals of liberalization and privatization.

2. In Iran, unlike developed countries with open and free economy, the private section must follow the government's policies that are dictated to them; and not the rules of the market. Thus, privatization only means substitution of 'state assets' with 'private assets' and not substitution of policies and decisions; so liberalization doesn't happen eventually with the meaning that it has in the rest of the world. Under such conditions, good and efficient managers and big capitalists don't enter this game and they prefer to try their lock in free countries.

Again the same closed circle[48] can be seen here: closed and governmental economy sends private managers out of the system and turns them into Diaspora. Exit of brains and assets leaves the space for the state and the economy becomes more exclusive and monopole. Khatami's efforts to break this circle only ended in a big defeat.

As told earlier, this article mentions the following reasons for lack of success in building international software trade and relationships:

1. The US-imposed trade embargo,
2. Poor perceived image of the country in USA and Europe,

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[47] In many cases the bankrupted factories were sold to the governmental manager who was responsible for the bankruptcy.

[48] 'The same' means that I have used this notion a few other times in this thesis. I have used this concept when two concepts, for example 'a' and 'b', are proportional. When 'a' increases, 'b' increases too. This in turn increases 'a' and the circle repeats. In the same way, when one of them decreases, the other one decreases too and the circle repeats again and again.

3. A general level of Middle Eastern instability.

Here I remind the ability of diasporas in contributing to solve the second and third problems, by lobbying and marketing and holding/attending IT exhibitions and representing good views of their homeland and its people; only in case of cooperation of the Iranian government. And the latter is not possible without solving the first abovementioned problem. And the experiences of three decades of Islamic Republic in Iran, particularly the 8 year experience of Khatami's presidency, show that a turn over of the regime and a complete and fundamental change in the governors' group is more possible and expectable (and efficient of course) rather than reform and unity in it.

Authors mention two key challenges in front of Iranian software industry:

• *How can Iran adequately meet the domestic demand for software applications of both the government and private sector?*

• *And at the same time develop capability of the Iranian software industry to become globally competitive?*

These two challenges are completely inter-related and in no way can be considered separately, because any progress in each of them both is required by, and will result in, a progress in the other (again we see the closed circle of two factors that amplify each other). So they must be managed the same time and forwarded step by step with each other.

Nicholson and Sahay suggest three crucial levels to address this challenge, in which we can consider following roles and services for the diasporas:

1. *The Policy level*, which involves compiling data and strategic research. As we have discussed in other sections, Iran is very weak at data and statistics gathering and strategic research[49]. Also because of long term embargo new technologies and methods haven't entered the country. Iranian students who have educated in foreign universities have also mostly stayed in relevant countries and turned into diasporas; thus haven't returned new knowledge with themselves. Thus this area is very vast and clear for the diasporas to offer their services to their homeland by implementing different kinds of relevant researches and introducing new and more efficient methods of gathering and managing industrial data and finally transferring experiences of developed and/or successful countries (like 3Is for example) in designing correct policies and enabling proper conditions for growth of IT industry.

2. *The Industry level*, which includes both producing and marketing. Diasporas can play critical roles in both areas. As for marketing, they can be the best representatives for Iranian companies at an international level, as they are familiar to both ends' atmospheres, know both ends' languages, can understand both sides' cultural gestures and differences, and they posses many more priorities over those who come from one of the sides.

As discussed earlier the most important share that they can have in production, is in project management, training staff and transferring knowledge, in addition to economic help and capitalizing.

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[49] In one case, the managers of a data gathering company were arrested and prosecution by the conviction of selling information to foreigners. The data that they gathered, showed that Mr. Khamanei (the supreme leader) is the most hated political character in Iran.

3. *The International level*, which includes Iranian expatriates, software providers and users globally. As this level is discussed in details in some other places, I skip it here.

In a section of this article, Nicholson and Sahay mention USA as the best and most important target of software export, from which Iranian producers are deprived, and after that Europe and Japan. But in the Middle East they recommend Afghanistan as good target for Iranian software export because of common language. But very recently Ali Asghar Halali, the director manager of Arsham Koosha Co. has written an article on this issue in which he has warned that Iranian companies are loosing the proper time and passing of the time will spoil Iranian companies' priority for their Persian language [59].

In his article, Halai reminds that first of all having the same language is not a big point. In addition to common language, Iranian companies should have equality with other rivals according to quality of products and availability of services and prepare all required conditions; in order to have priority over foreigners using the good and near relationship between Iranians and Afghans. He adds that presently many foreign companies have made special teams using the numerous educated Iranian (and Afghan) emigrants in western countries and have entered Afghanistan's market. Many others have joint ventures with Iranian companies, but Iranians are second or even third hand contractors. Some others, like Indians are teaching Persian language to their work groups; which is very easy for Indians. On the other hand English language is spreading in Afghanistan as the second language and presence of Americans in that country accelerates this. So to sum up, the passing of time is not in favor of Iranian companies in using this priority.

Secondly, as Halali says, Afghans are building a new country and they need everything and will accept any project proposed to them, but the fact is that they don't have any cash to pay for that. In fact most of the companies that are implementing their projects in Afghanistan, and among them software companies, are paid from the non-refundable aids of their relevant countries to Afghanistan.

Then he gives some recommendations on what Iranian companies should do to obtain a better position in Afghanistan's market that in two of them, Iranian expatriates can cooperate:

The first one is to talk and cooperate with those foreigner companies who want to be present in Afghanistan and have a budget from their own; or get the budget from their governments to invest in Afghanistan. This can be done as a common project or as the second hand contractor.

Moreover, Halali recommends Iranian companies to make themselves better known in Afghanistan and make contacts easier using some techniques that one of them is hiring foreigner experienced marketing companies. He says that Iranian consulting and marketing companies don't have enough experience in IT industry and particularly in international markets, so using the experiences of European and American companies will be very useful and even inevitable, despite its very high expenses according to Iranians' incomes.

Mohammad Servati, deputy manager of the Industry Center of the Ministry of Industry and Mining, also claims that Afghanistan's IT market is important and

precious for Iran; but Iran's successful presence in that market needs accurate planning [60].

Ghasemi, a member of the executive council of computer organization of Tehran, claims that the abovementioned planning begins in March 2006 by election of an executive council from 15 companies that will present their products in Afghanistan; and it is going to be finished after 11 months [61].

Servati, in a report printed in Hamshahri newspaper about 10 months before Halali's article in ITNA, claims the same priorities and hazards that Halali mentions. Moreover, he adds that Iran's government has agreed to give every year 50,000$ US to Afghanistan to be expended in IT field; and it is most natural for Iranian companies to get the relevant contracts.

Another point in this article is the problem of visa to Iran. Very recently, the parliament has passed a legislation to grant a short time visa to any foreigner who is coming to Iran at the border. On 11th of April 2006, Hamshahri, the morning news paper of Tehran, reported that the cabinet has extended this visa from seven days to 15 days. The number of airports has also grown to 9 from 6 [62].

Once again, in relation with Diasporas' role in making international ties and trust, we read: "*However, in nearly all cases of existing software export linkages there was some involvement of Iranian expatriates*". In absence of all needed infrastructures, Iranian expatriates are the only possible linkages between Iranian companies and international markets. Some examples of abovementioned structures are accredited standards, international and permanent software fairs and exhibitions, systematic marketing and most above all a helpful government and proper policies

It is also mentioned in this article that: "*It was also felt that the government demand was not well defined and hard to convert into specific projects that could be contracted out.*" Once again we encounter lack of project management and specialty in high levels in Iran, while there are many Iranian experts serving in different companies in all levels in developed countries, many of whom are ready to give best services to their own country.

These lines also confirm the same idea: "*Even though technical skills are high, the weakness of project management skills has led to the failure of large projects*"; and: "*Within the software development community there is an eagerness to develop outsourcing relationships, **but lack of expertise on how to do so** and also the handicaps of dealing with a US trade embargo*". This lack of experience can be compensated by the Iran's experienced expatriates.

I have also extracted a little point about my methodology and the main part of the theory part completely from the same article, which are discussed both in chapter 1, introduction and in relevant chapters. Methodology is the topic of chapter 4 and theory overview is that of chapter 5.

6.1.2 S. Krishna, Sundeep Sahay, and Geoff Walsham: "Managing Cross-Cultural Issues In Global Software Outsourcing" [63]

This article is the article that inspired me the topic of this thesis when I read it. It discusses how to address the cross cultural difficulties of global software outsourcing. In 'staffing issues' section of this article the authors suggest to use "*people who bridge cultures*" in order to solve cultural problems. The authors' first choices for this position are diasporas. But it is also noticeable that "*it is unrealistic to expect expatriates in any country to be able to think and act like locals*".

Then the authors introduce to complementary solutions for this issue. First, they recommend to use somebody that has grown up in the country of the outsourced company and has educated and lived for a long time in the outsourcer country to be sent back as the project manager to the outsourced country. Secondly, they recommend the client company to maintain a mixed cultural team in their company.

The interesting point in this article that I encountered it for the first time here, is the outstanding role of the diaspora in both sides. Before reading this article I used to think that in case of an outsourcing project, diasporas have a major role only in the client country; but this article shows their important role on both sides of the contract.

6.2 Other Books and Articles

In this section I review only a book and an article and leave the others for the next section and the rest of the thesis.

6.2.1 Nasrin Farzaneh Poor: "Application of IT in Asian small enterprises"

A book that helped me very much to prepare and then develop the material for chapter 3, was "*Application of IT in Asian small enterprises*" published by the Asian Productivity Organization in 2003 [12]. This book contains 12 articles about SMEs (Small and Medium-size Enterprises) in 12 different Asian countries. One of these articles is written by Nasrin Farzaneh Poor about SMEs in Iran. I have got the initiative data to prepare chapter 3 from this book and the developed and updated it. There is also an explanation about this book in section 4.2.1 of chapter 4, methodology.

6.2.2 Halleh Ghorashi: "How dual is translational identity?"

Another article that helped me to obtain a better conception about diasporas was "*How dual is translational identity? A debate on dual positioning of diaspora organizations*" [11]. The author is Halleh Ghorashi, an Iranian researcher in Holland. Her article is about Iranian traditional celebrations that are held in south California by the Iranian expatriates in order to keep their Iranian identity.

According to Ghorashi, Iranians of Orange County in South California have established an organization (The Network of Iranian Professionals of Orange County - NIPOC) for themselves in order to help each other to solve their business problems. But afterwards this organization has takes over the responsibility of all gatherings of Iranian Americans, including national celebrations.

As we saw earlier, It industry has no determined guardian in Iran [8]. On the other hand many Iranian expatriates do not rely on Iranian existent organizations like Sanaray and don't want to work with them. For examples of such people look at chapter 7, case studies number 6, 7 and 9. Under such conditions, Iranian diasporas can gather to each other in organizations like NIPOC and put their common efforts on a portfolio of small services that Nicholson and Sahay have mentioned in their article [3]. These gathering and organizations can be of big help for Sanaray's activities in case of solving the political problems between Iranians in the future.

Another interesting point about Ghorashi is her pointing to this fact that she has found no serious Iranian researcher among those who are inside Iran[50]. Shahram[51], one of my interviewees, quoted from her that all reliable and serious Iranian researchers on the issue of Iranian diasporas have been in foreign universities. This point confirms the lack of strategic researchers in Iran; and magnifies the role of diaspora in this regard.

6.3   Newspaper Articles

After my interviews, the newspaper articles have been the second important source of the data that I have gathered for this research. I have used many of these articles in different chapters of this research, particularly chapters 1, 2 and 3. I have also gathered many more articles that due to the limitation on time (and place) I didn't use them. In fact I gathered more data than I had time to use them. Thus I skip reviewing them in this section.

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[50] She has not written this in her article. I heard it from one of my interviewees; but I think this is the best place to cite this quotation.

[51] This person is one of those interviewees that I haven't reported him in chapter 7. Shahram in case description 9 of that chapter is another person.

Chapter 7: Case Description and Analysis

As mentioned earlier in chapter 4, methodology, I have gathered most of the material I use here in this thesis, through several interviews; and after that, reading articles- particularly news- has been the second important tool that I have used.

I have discussed several of the points that I have seen in the articles, earlier in chapter 6 and other chapters, and generally the information that I have extracted from the articles and newspapers, are distributed and referred all through this thesis.

So, in this chapter I will focus on the interviews I have done and discuss the points that I have extracted from them. In this regard I will explain my findings in the first sections and then mention the most important interviews in the last section as case studies.

7.1   Problems That Limit Software Export

Although the topic of this research involves the role of diasporas, explaining the problems that hinder the production and export of software can make the role that they can play clearer and more distinguishable. So in this section I mention the problems that I have found during my interviews and news readings.

7.1.1 Problems in relation with USA

As the most important problems in this regard, are due to the American embargo on Iran, so it is more rational to begin with this one:

Problem of sending money to Iran
According to the United States' economical sanction on Iran, direct transfer of money from US to Iran is illegal and the sender will be under prosecution. To solve this problem, a mediator company in Canada, Europe or Dubai can be the contractor with the American company on one side and the Iranian one on the other side. Apparently according to low, if the American client be unaware of the existence of the Iranian contractor, there is no problem; otherwise it would be a case of smuggling and money washing.

Problem of sending consignments between the two countries

According to the mentioned sanction sending high tech consignments like UNIX servers and so on to Iran, is illegal and preparing such goods from other sources is not easily possible in some cases[52]. There is no problem with sending books and educational material.

On the other hand importing computer accessories from Iran is illegal in the United States, so making hardware in Iran and exporting this to America is confronted with this problem[53]. This problem too, can be solved by sending hardware goods to a mediator country, like UAE (Dubai), and repacking and resending them to the United States, which of course increases the expenses. Sending software, and in general 'Intellectual Property' through internet is easily possible.

Relationship problems

Working and cooperating with a person who is a resident of Iran, is illegal for American citizens and connections must be established carefully.

All these problems make working with Iran too difficult and unwise and unworthy for American companies. Currently, almost only those Iranian expatriates in the United States that have near relative in Iran and want to do him a favor accept this risk and undergo the procedure. This fact signifies the role that Iranian expatriates can play in case of normalizing the relationships and solving the problems.

7.1.2 Economical problems

High inflation rate in Iran

The very high inflation rate[54] and unstable economy of Iran, makes planning very difficult. For example the real inflation rate which is about 20%, results in the 25% approximate growth of the salary, which is not proportionate with foreign markets. The artificial stability of the price of foreign exchange at Khatami's period has caused direct reflection of this inflation in project's expenses.

Too fast growth of market (programming wages and salaries) in Iran

The rapid change in the government's view towards IT, has evoked many programs to develop and capitalizing in this industry. These programs have caused rapid rising in the wages of IT experts in Iran, despite its late decreasing trend in west[55]. On the other hand, simultaneous implementation of project in governmental and private section and spending high and irrational budgets on these plans, has caused too high prices. This in turn, makes the use of Iranian experts expensive and uneconomical

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[52] Instead of solving this problem, the current Islamic government intensifies it by insisting on the nuclear issue of Iran and other debates.

[53] Some simple and small hardware parts can be produced in Iran with cheaper prices; the same as many other countries and above all China, are doing that successfully.

[54] It is declared to be about 15% by the government, which is coming down toward 12%. But independent sources estimate it to be more than this, nearer to 20%.

[55] Anyhow the salaries in Iran are about one tenth to one twentieth of that in developed countries. So they are still not comparable, even if this rises and that shrinks a little bit.

comparing with Indian and eastern European forces. So it is not profitable to use Iranian engineers for those companies who have branches in few other countries. Yet, small companies that do not afford running a foreign office for themselves, may be good commercial targets.

Project overheads

According to Sanaray's report, direct salary overhead for software projects in Iran is 45%, operational overhead is 62% and non-operational overhead is 33%. According to the expected benefit, tax and project risk, the final reported overhead reaches up to 240% which is very high comparing with that of other countries.

7.1.3 Management problems

Lack of talented, educated, and experienced management in Iran

One of the major problems in front of software production in Iran is the weakness of project management and technical management. There are very few people who have studied management and are capable of managing human forces in Iran. From this few, a smaller part of them are familiar with IT management. In the same way, IT experts have no familiarity with management. Just to make the picture even darker, we should remember that those who gain high levels of experience, tend to leave the country and find better jobs and lives in better countries.

Remote management

Remote management has low efficiency and it is required that the managers be familiar with the particular conditions of the place of their work. Many of such managers are obliged to travel to the place of project few times a year and become familiar with the conditions directly; but this is too costly and problematic and moreover it is not possible in some cases. Actually, this method is not practical and economical because of its communication overhead and low accuracy and low efficiency.

Thus, this is one of the best services that fit the situation of Iranian expatriates who are good software project managers and want both to reside in a western country and visit their homeland every now and then. This way they can both lead successful projects in Iran and transfer their knowledge and experience to the Iranian staff as is mentioned in the next paragraph.

Remote management education

According to the above problem, the first solution is educating the local managers while they are working. This procedure requires putting time and expenditure from the foreigner managers. It means that the local manager must be in continuous contact and consultancy with the foreigner manager and learn the management practically during this process. But most of the foreigner managers, in addition to the management of the remote sit, have very heavy responsibilities in their own office that prevents them of spending enough time on this process.

Again in this case, it fits Iranian expatriates who have near relations in Iran and want to do a favor to them and are ready to sacrifice their position in order to give a service to their family and homeland. These three cases are discussed in the next section in more detail in case studies 2 and 3 of chapter 7, the interviews with Hooman and Aziz.

7.1.4 Cultural problems

Team work

Producing software in a large scale needs a very good organized and continuous team work, which its cultural background in Iran is very weak. Culturally Iranians are accustomed to individual work, and can not harmonize themselves with others. In case of attending a group work, many want to be the leader and expect all others to accept their opinions, and sometimes they interpret the opposite situation as an insult to their personality and ca not share their efforts with others.

Different points of view and expectations

The general view of people towards work and production in West is different with that in Iran. The recent cultural changes in Iran have intensified these differences, and it makes working with the foreigners more difficult. For example this slogan: "The customer is always right!" is really valid and working in West and the contractor does everything to satisfy and attract the customer or client. But in Iran, it is the client that has to cope with the contractor's conditions. For example delay in giving service or delivering the product will result in recompense and penalty payment and losing the job in west; while in Iran delay is completely normal and contractor expects the client to know about that already and accept the new conditions easily. Under these conditions, working in the rivalry international market in which each day of delay costs so much and destroys the reputation, is very difficult for Iranians.

7.1.5 Communication problems

Communication overhead

This item includes the expenses and extra time that are used for communication between the project implementers and the taskmaster or contractor over remote distance. This factor will decrease by giving more order in the works, signing the contracts and few more experience, but it always exists. Relatively high internet prices in Iran increase it.

Internet problem

Access to the internet is both very expensive and too unreliable in Iran. The problem of cut off or improper connection of the internet lines usually causes high

communication overhead and long delays in giving service. Internet problem is discussed in detail in section 3.2.3 of chapter 3.

Inadequate English language

The weakness of English language among Iranian personnel increases the overhead of remote communication. Learning English language along whit working can reduce this problem. Generally, educated personnel know elementary English. A common desire to go abroad among this group, encourages learning better English. Watching English movies on video, DVD and satellite TVs has raised average level of English knowledge among Iranians in the recent years too.

Time zone difference

The difference of workdays and work hours in Iran and western countries increases the communication overhead. In Iran (like in many other Islamic countries) Thursday is a half time workday, half time holiday and Friday is completely holiday and Saturday is the first day of the week; while in the West Thursday and Friday are complete workdays and Saturday and Sunday are holidays. This difference limits the overlapping workdays to only three days. Yet still the 2.5 hours time difference between Iran and central Europe and 8.5 to 11.5 hours difference between Iran and USA makes the communication more difficult.

Of course there are some solutions to reduce this effect. Asking the staff to work at Fridays and rest on Saturdays, as well as working later at evenings are too examples of such solutions.

7.1.6 Other problems

A- Sometimes the taskmasters prefer to implement those projects in Iran that are of low importance, and are not so urgent and critical. Such projects put lower pressure on the implementer team and it makes them think that their job is not very serious. This in turn leads them to lower efficiency that is eventually harmful from both individual and group point of view.

B- Taskmasters generally tend that the education of the Iranian team be as individual studies and on out of the project's process. The foreigner contact also prefers to spend a short time to communicate with the local manager. But unfortunately this kind of education has not an acceptable efficiency. Because first of all the educational material is not relevant enough to the daily work of the staff. Secondly too much time is wasted for the education and the project's progress speed slows down. On the other hand, the local manager will be deprived of consultancy and practical learning of management because he has to put his focus on training the staff.

C- Some of the employers prefer to hire the Iranian team without social security insurance and tax expenses, and merely as employees that are not registered formally;

in order to minimize the financial overhead of the project and make it acceptable[56]. This kind of contract is not only illegal, but also puts the whole responsibility pressure on the shoulders of the local manager and distracts his focus from technical aspects of the project to the legal issues of the work.

D- According to the relative ease of global software outsourcing, and abundance of software experts comparing to hardware experts, most of the foreigner outsourcing projects are software projects and there is very little consideration to the proper potential of Iran to cooperate in hardware projects[57].

7.1.7 Some ideas to solve the problems

A- The experts and implementers should share the benefits and losses of the project in a way, in order that they try to increase the quality and quantity of production and work with more hope and encouragement[58].

B- According to the new market of software industry in Iran and prediction of a good future for it, the Iranian team must be actively present in the internal market, along with working with other countries too, and practice critical projects under the real pressure. This way they will try to raise the quality of their work wile they are working with the foreigners and also won't loose the profitable internal market. Another important aspect is that the company would be less dependent on its income from foreigner companies and can survive if there comes up some unexpected international and political tensions.

C- Education of the technical team should be done both personally and during the work. Personal education is up to the employee and should be out of work hours. At determined intervals, the company should get professional tests that shows the employee's knowledge and skill level and eventually will result in the professional and financial promotion of him/her. The education during work should be in form of reviewing and commenting the results of the team's work in short intervals and giving consultations and recommendations by the foreigner expert team. Management teaching, in addition to personal studies, should be during the work with spending enough time from the foreigner contact and should be transferred organically to the lower levels of management.

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[56] The employees also prefer this method, as they don't have to pay tax and insurance fee and apparently they get more money.

[57] Actually, Iran is very weak in hardware and hardware productions don't even answer a small part of the internal need. Even very simple circuits are sometimes imported from other countries (generally from China) due to their low prices. I know many hardware engineers personally that work as programmers and software experts.

[58] This one almost never happens in Iran and regardless of how much the employee works or how much is the efficiency and outcome of the company, he is paid a constant salary.

D- The Iranian team must be registered formally and legally[59] and its responsibility should be shared between all the team members in a way.

E- High expenses and overheads of working in Iran should be covered by a proper choice of both internal and outsourcing projects[60].

F- Iranians can easily do and should do designing and programming (and not manufacturing) hardware systems like Firmware programming, Embedded System Design and printed circuit board (PCB) design in addition to software programming[61].

7.2   Case Studies

In this section I review the interviews that I have done with 18 people in 17 interviews. All interviews have been with one person except for one case with Shahram and Parsa. The total number of interviews has been 17, but I don't write 3 of them here, because of their lower importance; and 3 others are put together in case of BIHE.

7.2.1 Case 1: Interview with Thanh

Thanh is from Vietnam. He studies at ifi in UiO and has come to Norway to get his Master and is supposed to go back to Vietnam after getting his degree.

He has worked as a developer in TMA Solutions Co. for two years. TMA, as he says, is the biggest company in Vietnam that does software outsourcing and about 600 engineers work for this company. It is planned to reach to 2000 technical staff by 2007 with a 75% annual growth during the last eight years, since its inception in 1997 [64]. This company works on telecommunication with focus on networking.

Although the owner of TMA is from Vietnam and resides in Vietnam, TMA was founded by oversea Vietnamese. As for now, five out of its six managers are Vietnamese and only one of them has studied abroad (and has of course gone back to Vietnam), the vice president, is a British who lives in Canada [65]. Generally the establishers and owners of many other software companies are those who reside and even work in USA or other foreign countries (the group that we call them Diaspora). It is very easier for them (the Diaspora) to get contracts. So it is very important for the

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[59] There are many companies that don't register themselves in order not to pay tax and insurance fee.

[60] According to Hooman, working for foreigner companies is so problematic that hardly covers all expenses and the company must have also some internal projects in order to use its work time efficiently.

[61] This recommendation is completely confirming that they recommend Iranians to give a portfolio of services (3.   Nicholson, B. and S. Sahay, *Building Iran's Software Industry: An Assessment of Plans and Prospects.* EJISDC, 2003. **13**.)

companies to have some foreigner contacts, otherwise they will have problems to find clients; and of course it is the same for TMA too.

Also most of them sell their products to foreigner companies, in other words they are outsourced and don't work to cover the internal consumption[62]. There are two reasons that the companies generally work for foreigners and not for internal use. First, they don't have contacts. Secondly, the price of the product is rather high and it is difficult for the internal users to buy it (this statement is still about outsourcing companies and not all software producers).

But the point here is that the bigger part of the profit of this high valued product, i.e. software, goes to the pocket of the owner of the company, and the workers take a smaller share. And as most of the owners reside in US and not in Vietnam, then this money as an added value which is produced in Vietnam and should improve this country's economy, in fact does little help to Vietnam's economy. For example if a developer's man–month work costs 5,000 US Dollars inside US, it is only about 300$ in Vietnam (so much like that of Iran). When the company owner calculates this amount about 2000$ in his product's total cost, this difference goes to his own account which is in US and doesn't reach to Vietnam. So we see that the whole procedure can have a very much better impact on Vietnam's economy rather than what it has now.

Thanh estimates that he may be able to receive up to 500$ per month when he returns back to Vietnam according to the higher education that he gets in Norway and his experience, yet we see that it is still no big deal and we should also remember that his calculated man-month price will increase also.

The monopoly of the software outsourcing in Vietnam is not for Americans. There are also some Germans that run software outsourcing companies in Vietnam, but the majority of them are Vietnamese Diasporas[63].

As for the difficulties in front of software outsourcing in Vietnam, Thanh mentions two problems. The first one is finding well-qualified personnel, according to both their software development abilities and their English language knowledge. The other one is the high cost of internet services in Vietnam.

Than mentions the following positive effects of software outsourcing on Vietnam in addition to its economic and job making effects:
1. Transferring new high technology to Vietnam.
2. Transferring progressive management and project management knowledge.
3. Transferring software development and international marketing experience.
4. It has even had positive effects on hardware infrastructure development in Vietnam like improvement of networking and internet lines.

7.2.2 Case 2: Interview with Hooman

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[62] Thanh has been talking about software outsourcing companies here, and it is in contradiction with Hooman's opinion that believes that outsourcing companies in Iran should work for internal market too.

[63] So in comparison with Iran, we understand that Iranians loose the best chances for outsourcing because of their dark relationships with the United States. When we compare the relationships of Iran and America in the 60s and 70s with that of Vietnam and America in the same time, we acquire a measurement of the degree of mismanaging and foolishness of the Islamic rulers of Iran.

Hooman is a 34 year old male software engineer who has recently gone to England to get his Master. He has been the manager (and founder) of a software outsourcing company which we call it SN Co., for about 6 years. At 2.2005 we met in Tehran and at that time he mentioned the following problems as the biggest ones in his job. Notice that a few of them are discussed in section 7.1 too, due to their importance.

1. Transferring money from US to Iran is very difficult and it requires either a mediator company in another company or some other methods that anyhow, it raises the overhead and decreases financial efficiency.

2. The overheads are too much.

3. Educating software engineering is not correct. It doesn't have a proper structure and follows no particular goal according to the needs of the market. Thus, universities should reform their systems. Those companies that know the job properly don't investigate on training staff and always search to employ experienced experts because the private section has its own limitations. So software graduates get only technical education rather than empirical and applied education.

4. Lack of proper management in all levels. An IT manager must have both IT and management knowledge and that is rare in Iran.

5. Iranians can not do group work.

6. Iranian companies look after easy money and don't want to work hard to acquire a nice reputation. They are generally looking for an easy big money, so they look for big projects and are not content with small or hard jobs[64].

7. Required infrastructures are not built properly yet in Iran. Internet is too expensive and has a low quality.

8. All hardware is Intel and IBM based and there are no sun products and UNIX platforms. The main problem is with Americans' embargo on Iran. The popularity of Intel and IBM based PCs in Iran is because their architecture is open and such machines are easily buyable from any resource, but Hi-Tech hardware is not easy to buy. For example taking a UNIX server from US to Iran is smuggling from both sides, and it limits the manoeuvrability of the Iranian companies.

In the same way, more than 90% of the available software in Iran is Micro Soft based. The reason is that Micro Soft products are available for free or very low prices in Iran; of course without copyright. This factor intensifies the abovementioned limitation.

9. All economic and executive systems are under the governmental monopoly. This monopoly decreases the quality and increases the corruption. Thus, finally no project will be fulfilled correctly and in reasonable time. Khatami's government tried to put and end on the government's monopoly in many areas and privatize all industries as much as possible, but his policy was not successful. Because owners of big capitals and high specialties don't investigate in Iran at all, and those who do, have no action freedom and must follow the policies that the government dictates to them; as if they are the government's agents with their asset and not the "private section".

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[64] Exactly confirming Nicholson and Sahay (3. Nicholson, B. and S. Sahay, *Building Iran's Software Industry: An Assessment of Plans and Prospects.* EJISDC, 2003. **13**.)

Finally Hooman recommended that in order to provoke and ease software outsourcing in Iran, internet must become cheaper and more reliable. In that case, some people will begin to work for foreigner companies at their homes, or offices. It means that individual experts can work for foreigner companies whit minimum overhead[65], which is efficient and economical for them and easy to handle for both sides as it does not interfere a local company and expenses for place and staff and insurance and many other overheads and omits the problems of management and eases the communication.

This way moreover than money, knowledge and experience and education will enter the country and gradually these people who have begun from small businesses will establish companies and develop their business. Eventually this process will shape the portfolio of services that Nicholson and Sahay point that out in their article [3].

At that time he was paying 500 dollars per month for the wireless broadband internet service at his company. The speed of that connection was 128kbps receive and 64kbps send that meant 4000 US Dollars monthly for each Mega bits per second of data[66]. Such high overheads and other communication problems were forcing Hooman to seek more internal contracts rather than foreigner ones because working for internal contractors was more practical for him.

Hooman has left Iran at August 2005 to continue his studies and has bailed his company to somebody called Aziz; and claims that he is not aware of the current policy of the new manager. But he believed that the company will soon cut off its cooperation with the American contractor and focus on working with internal ones due to the numerous problems of working with outsourcers. His last sentence was this: "They (the foreigner contractors) were in some conditions that we didn't understand them and we were in some conditions that they didn't understand us"; and concluded that under such conditions it is impossible to continue cooperation.

7.2.3 Case 3: Interview with Aziz

Aziz is Hooman's successor in SN Co. who has taken over Hooman's responsibility from summer of 2005, after he left Iran.

As Hooman predicted, the company gives no longer any services to the American company but their relation is not cut off completely yet. The story is as follows:

SN Co. has been the support group of the American company's software until last year. But the Americans have recently shifted their focus to IBM RS/6000 main frames, or p5 and ps5 models. Their operating system is AIX or its newer version, AIX 5L. Exporting these servers or their operating systems, or even their relevant software to Iran is illegal; due to the American embargo on Iran. So it has become impossible for the Iranian company to continue working for the American one. Thus they have reduced their cooperation gradually during 2005, and eventually have cut off their

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[65] As discussed in chapter 3, the relevant ministry in Iran has ensured its customers to give cheaper, faster and more reliable internet services in 2006.
[66] This high price is in case of a valid IP address for the customer; otherwise the prices are lower.

support to let SN Co. become independent and can survive only with working for the internal market.

Yet the Americans are still training SN Co.'s staff in Iran through remote training. Their goal is "upgrading the level of informatics knowledge among the Iranian personnel, based on systematic principals" as Aziz says; in order to have this staff in Iran to use them in near future[67]. Thus, in fact the American company is making an investment in Iran with no cash response. I consider there are three reasons that the owner/manager of the American company does this big favour for them. First of all he is near relative of Hooman. Secondly he is a Baha'i, so he does it for Hooman's friends who are totally Baha'is too[68]. Finally he is Iranian too, and wishes to do this for his birth place; even though it is difficult for him to speak Persian. In the absence of any one of these three factors, it was hardly ever imaginable for me that he was ready to do all these efforts without having reasonable economic benefits.

SN Co. is now working for the internal market, yet they very well pleased to use the trainings of the American company. They have used the Americans' progressive training and management system to implement a powerful group work in SN Co.; which according to Aziz's opinion, is exclusive in Iran.

Aziz points to low cost of workforce in Iran as its power point, and poor level of English language as its weak point. In addition he is still dissatisfied with the high cost of internet to a very high extent.

In this case we are introduced to another factor in diasporas' role and that is the effect of their personal beliefs on giving services to their homeland. In case 12 we will have another discussion, both on this factor and on the remote education in Iran.

7.2.4 Case 4: Interview with Kovan

Kovan is 31 year old man and has been born in Kurdistan, Iraq. He has come to Norway about 20 years ago. He has got his master ('hoved fag' at that time) from the University of Oslo in informatics (Concurrent Software Development) in 2003. At the same year he has established his company called G. IT S. with a friend of his, and in 2004 a third one has joined them.

They have started their job as a consultant company, which means that they consulted companies to solve their IT problems. But now their focus has shifted to making programs of their own, and they do much more development jobs rather than consultancy.

As an Iraqi Diaspora, he has also proposed some projects to give services to Kurdistan. He has been in Kurdistan for two months in 2004 for three months in 2005. His company has presented two projects for Health Ministry and Education ministry (of Kurdistan) and the prototype of another one is under discussion with the

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[67] In addition to many other analysts, almost all Iranians are waiting for a fundamental change in the conditions in Iran in a near future.
[68] For more explanation on this factor, look at case12, about BIHE.

Agriculture and Water Department[69]. According to the safety and security problems and lack of a stabilized government in Iraq, Kovan has presented his projects only in Kurdistan for the regional government, and not in the rest of Iraq.

After the first war of the Persian Gulf, Kurdistan acquired a kind of autonomy and has been controlled by local forces from that time. The parliament of Kurdistan which is elected democratically has the highest position in that region. But the troublesome point is that there are two major parties in Iraq's Kurdistan (and in the parliament), PDK (the Democratic Party of Kurdistan leaded by Masoud Barezani) and PUK (the Patriotic Union of Kurdistan leaded by Jalal Talebani) and each of these parties controls the rejoin of its own dominance in a way. The party has the role of the government in its region and assigns all managers to all positions. The first very big problem for Kovan has been the split governance of Kurdistan. If one wants to do something there, he must talk to the party there, so if you want to mechanize a system, you can do it in the region of the party that you have got its agreement, and not in the whole Kurdistan. Although according to the late agreements between the two groups, and also the stabilization of the Iraq's central government and the late elections, the genenral situation is getting better and better everyday, yet it is not satisfying and desirable yet.

According to IT situation in Kurdistan, Kovan describes it as very weak and limited. The use of PC machines is not common and widespread. Computers are found most of all in internet cafés, and their most popular usage is as chatting machines, email machines or at most as very progressive typing machines.

"They need almost everything" as Kovan says. There is almost no infrastructure built in Kurdistan and they have to be built from zero, and this makes a very good opportunity to establish uniform standards and implement big projects easier than in first world countries; as they don't conflict with any previous standards. A very big problem in front of making big, monolithic and all consistent systems in progressive countries is that almost all organizations, either private or governmental, have their own proprietary system. So it is very difficult and too expensive to substitute all existent systems with a new standard system. But in poorer countries, due to the clear background, it is by far easier and extremely more efficient to design and implement monolithic and all consistent systems.

He believes that we must build the infrastructures by ourselves and establish structures similar to what we have in the West. But the government should be the motivator and executive force.

Kovan distinguishes four important problems that we, as people who both have seen progressive countries and modern systems, and the same time have the same culture and language and background, have to solve before giving our service to our homelands.

1. The first big step is making the IT understanding. No doubt, we have lots of IT experiences and a very profound understanding of what IT can eventually do for us. As inhabitants of a developed country, IT services have new become a part of our lives. When we go there (back to our own country), we encounter lots of people that are used to old methods and do their jobs through paper work and have

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[69] He was still waiting for an answer at the time of this interview.

very little ideas of what IT can do for their life. So this very difficult job is our duty to show them what opportunities IT gives them and how efficient can they do their jobs using IT technology. This concept is called 'IT revolution' in Iraq, but it is in fact a 'mind revolution'.

A very big problem in this way, as Kovan says, is this wrong belief that computers will do the humans' job and substitute them, and thus cause the increase of joblessness. So the parties confront with IT and automation of systems very cautious, as they want to show that they support the ordinary people and attract people to themselves. On the other hand ordinary people hate computers as they think computers are coming to substitute them and get their jobs. Although it may be a true idea, anyhow the time goes forward and all nations should encounter such eras; the sooner they catch up with new technologies, the better for their own sake.

2. The other problem is to explain why big project cost so much, and how are they made that is so much time and money consuming. It is strange for them to accept spending a big amount of money on something that is already being done in a way. For example if you say that a HIS costs two million dollars, while this is only the expenses with no or very little benefit; they say that we can build a new hospital with this money and it is not wise to spend such a big money for software. Actually, software is not touchable and even the biggest systems can be saved on a very small disk.

As another example, if you say that in order to make a small utility a one year time is needed and it will cost 500,000 US Dollars, they will amaze so much and say 'why?'! They expect the problem to be solved in shortest time with cheapest price. "You can install a Micro Soft Windows in less than an hour and its code covers a full CD and most above all it is 'completely free'" they think[70]. So you have to explain that this package costs few hundred dollars and millions of people pay that money, so the company actually receives hundreds of millions of dollars for this 'free' package.

3. The third problem is project management. Normally the high level managers are members of the party and they don't have high education or specialty. Talented and qualified people don't occupy high positions because they are not party members or they don't have powerful contacts. Generally to acquire a position it is not important that how much do you know or what can you do; just it matters that whom do you know (who is your contact).

So, when you want to analyze a project, they can only tell you what they want, and show no or very little help about other requirements and details, because they have no vision about it. Then you have to do everything by your own and discover or guess all what you want; and finally after three months of work, they say: "No, this is not what we need or want". So all what you have done resets and you have to begin again.

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[70] In the countries that are not a member of copyright low, almost all software are illegally copied and sold in the market for the price of their empty disk, so they are really distributed for free.

4. Finally he mentions 'the priority of quantity (and volume) to quality, as the last big problem. Totally as Kovan believes, in the Middle East and our region, people are concerned with 'quantity' and not 'quality'. It is very important for them that 'how cheap' a product will be finally and not 'how good'. Corruption intensifies this situation, as corrupted managers always want to show that how much they have done with their budget, as the quantity is visible and the quality is not.

My last question was: "what role do you consider for yourself to fulfill in Kurdistan or in the whole Iraq?

First of all he reminds that he is not fundamentally nationalist to think of Kurdish interests only. He has come to Norway from early childhood, so he is as Norwegian as he is Iraqi and Kurd. Thus, his first priority is giving a good service to his people and country, not to achieve a position or something else for himself; "I think of what is best for the people of the region" he says. He also points to the deep and wide technological gap between his homeland and progressive countries and he says he can narrow this gap. But unfortunately those who have control over there don't want it and don't let him[71]. Thus, as he doesn't want to interfere in politics, his job becomes by far more difficult; as he can not say whatever he thinks and give them all kind of advice.

Yet he believes he is able to do very much for Iraq, even under such difficult conditions.

According to what Kovan explained about Kurdistan and comparing them with Iran, I have to tell that more or less there are such conditions in Iran too. But the value of his opinions in relation with this thesis, is because of what he considered as the role of diasporas.

Also I agree to a high degree with his opinion on big monolithic systems, and creation and establishment of infrastructures. For example in Iran, banks were among the first organizations that tried to automate their systems, but there was no control and supervision to coordinate their work. So Iran has a disastrous banking system today, that works with the methods and rules of a few decades ago. There exists almost no nationwide electronic money in Iran, and the existent plastics are extremely proprietary, and you can use them only in few branches of the issuing bank that have a cash machine. They are not usable in other banks and not in stores, as there are few different incompatible cards and it is not economical and reasonable for stores to use one or few reader machines. The lack of the relevant culture is also hindering the use of existent electronic money. Iran's economy is based on payment with either cash or checks. But you can cash a check only in the very branch that it is issued; and even not in other branches of the same bank. Although some activities have been done to solve these problems recently, they are not generalized yet.

Another very important point that Kovan pointed out, is the role of government to cooperate with and enable those expatriates who desire to do some help. In case of Iran, we obviously see that lack of a helpful and cooperative government has actually

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[71] First of all it is because of their lack of knowledge and their deep suspicion to every thing new particularly from the West. Secondly they may be simply jealous or have some benefits that are satisfied better when the old methods and technologies are in use.

paralyzed almost all those expatriates who want to give a service to their fellowmen an their homeland.

Finally the most noticeable point in his opinions is this belief that he wants to narrow the deep gap between the two sides. It is not important that how little the service is that one person can give to a non-developed country. When millions of people do each one a small part of the job, in total it will make an enormous improvement in that country. In this regard, diasporas are the best group of people that can narrow the deep gap between their old homeland and their new country, as they have roots in both sides and can transfer new culture and progressive methods more efficiently and with less cultural conflicts.

7.2.5 Case 5: Interview with Dr. Zarei

Dr. Behrooz Zarei is the manager of the electronic government plan in Iran. The goal of this plan is automation and computerization of the governmental services respectively to governmental sector, business sector and finally to all citizens. He said that "we are still working on the first phase (government to government services), but we have made very outstanding structures in this section that can turn into infrastructure for other progresses in the future".

He gave me a few of his articles which I have used in many parts of this research. Moreover, my particular question of him, was about strategic research on IT issues in Iran. He said that there are a few running, but this amount is not sufficient at all. Ha also added that the efforts of Iranian researchers in foreign universities and research centres can be of great help in this regard; but they it can be only in performing the researches and not implementing relevant projects. He stated that he is aware of a few of such researches, but he didn't mention them.

7.2.6 Case 6: Interview with Shahab

Shahab is 35 year old software engineer who is born in Iran, but has immigrated to Norway about 18 years ago. Now he works as the DB manager in a company near Oslo.

His answer to my questions is short and clear: doing anything for Iran or having any cooperation with Iran at present time, is 'betraying'; because it prolongs the Islamic regime's life. Even, according to his opinion, staying in Iran for somebody who can leave it, is twice betraying. Firs, it is betraying to one's self; then it is cooperation with the regime. But in case of changing the regime, "I will go there and do everything I can for free" he says.

This case shows the attitudes of a big group of Iranian expatriates that their help can be very useful important for their homeland; but they are either afraid of dealing with the current system (and they have right to a very high extent), or they don't want

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to help this system at all (I don't agree with this attitude, because the people of Iran suffer heavy losses this way). On the other hand this case shows the big potential of Iranian diasporas that can be put to use and work in case of improving the ruling system of Iran.

7.2.7 Case 7: Interview with Nariman

Nariman is 37 year old mail electronic engineer who works for a security systems company in Oslo. Despite the previous case, he has a positive mind to cooperate with Iranian companies and even the embassy, as he doesn't mix politics with his attitudes towards his country.

He believes that one of the main obstacles in front of working for/with Iranian companies is the Iranian regulation and rule system. Another one is lack of important infrastructures and equipments. Also, the private sector has not the proper framework to work with foreign companies.

In 2002, Nariman has tried to begin outsourcing an Iranian company which belongs to a friend of him. They had begun with a small project for a Norwegian company, but the first project has been the last one too. According to the poor quality of the internet lines in Iran at that time, sending and receiving the program through the net has been too difficult. Communicate via normal mail has also been impossible because of wasting too much time and security problems in Iran. So he has regretted after the firs project.

Thus, he concludes that the biggest problem is the lack of proper infrastructures; and this is due to the monopoly of the government in this field. He reminds that in Norway too, Telenor had a monopoly until a few years ago; and the service was not OK at all in Norway at that time. As we see, the quality and quantity of IT services has become so much better in Norway after the monopoly of Telenor has been broken up. In sum, he believes that the biggest problem of the economy of Iran, is governments monopoly.

As mentioned above, he points to the lack of proper legal system as the other important issue; particularly lack of economical security: neither job security nor asset security. In absence of these major factors nobody will risk to invest in Iran; so the governmental monopoly won't break up and the economy won't progress.

Nariman desires to establish his own company in Iran and outsource that branch from his office in Norway (he believes that one should have his own company in order to have full control over his job). He points out the ample highly-educated man power in Iran and its low cost, as the most important points for working with Iran. For example if an IT man-hour is 1000 NKr in Oslo, it is the same price for one day in Iran. But now, the risk and insecurity of working with Iran is too high, and it is not worthy to try.

He suggests that under such conditions that diasporas can not/will not work with Iranian IT companies, they should come out in the world and establish contacts with the companies in Europe in order to send people here to learn the European way of working and doing business. This way they can adjust themselves with their would-be

customers. Again in this case, we see that Iranian diasporas who have lived in the West for a few decades and know every thing about working with the Western companies, their management methods and ways of doing business, can be of great help for Iranian companies to connect to the West. This way, Iranians save heavy expenses of training their staff and expatriate connections gain a good deal of money; but big problems should be solved first.

As the last word on the role of diasporas, I asked him what can/should we do now as diasporas? He believes that we should keep our contact with managers and organizations in Iran and make them to do the reforms. Government should build the IT infrastructures and IT parks and IT cities, during a 5 to 10 year plan; and deliver them to small and medium size enterprises (SMEs). Universities should also coordinate with industry and research sector. Nariman added that he has been following the same procedure for a few years by attending some gatherings in the Iranian embassy in Oslo, and some other activities. But the pressure of other expatriates who called them 'betrayers', has made the grope to abandon the gathering at the embassy.

Here, it is noticeable that Nariman and Shahab are obviously in two opposite sides: Nariman belongs to that group of Iranians who still hope for the reforms inside the regime, and believe that all Iranians should deal and even cooperate with the Islamic rulers to make them accept the reforms. The other side consists of those Iranians who are satisfied with nothing less than the complete turn over of the regime, and in this way believe that even the smallest deal with anybody in Iran prolongs the regime's life; so it is a betrayal and we should avoid that.

As a Baha'i, I belong to none of these groups of course. But as an Iranian, while I believe that no reform in the Islamic regime is possible at all, I do the best I can for my country and its people regardless of the political regime or any other political factor.

7.2.8 Case 8: Interview with Mr. S.

Mr. S is an Iranian American who has left Iran long ago. He works in a software company where he is the manager of a section. He desires to have contact with Iranian companies and outsource them; his company has not agreed with it, due to the embargo. Even there have been some good cases that suited his friends' company in Iran, but because of the embargo his company's managers haven't taken the risk. Because it needs a middle company in Europe or some other place and it won't be efficient; moreover it is risky and problematic.

Mr. S is another example of those who want to deal with Iranian companies, but they are not able. In cases 2 and 3 about SN Co., the American company had a branch in the Eastern Europe already, so it was possible and empirical for them to establish cooperation with SN Co.; moreover, the owner of the American company was a very near relative of Hooman and there has also been one other important factor involved

with the case that I am not allowed to mention. Otherwise, as said before, it was very improbable for them to establish the connection and continue it in long term.

7.2.9 Case 9: Interview with Parsa and Shahram

Parsa is 23 years old and Shahram is 35. Both have come to Norway from 1990; so Parsa has been only 8 years old when he came to Norway. Thus I expected him to be more Norwegian than Iranian, but he is definitely more Iranian and speaks Persian very well, with no foreigner accent. They have recently established a computer services company in Oslo, where I met them and interviewed with them.

One of their activities is making web pages; for which they have got help of a web page writer in Tehran. Their correspondence is through telephone and internet; but despite Nariman in case 7, they are very satisfied with their connection and they have no problem in this regard.

Their deal is totally based on bidirectional trust. Parsa and Shahram pay half of the contract's price first and pay the other half after the completion of the job. So, both sides have to trust the other one for half of the amount; yet both are satisfied, because the Norwegian side pays by far less and the Iranian get a little bit more that what they should pay and get locally.

But, as Nariman said, they wish to open a branch in Tehran to have more control over their job. This way they can also get benefits from the vast and expanding IT market in Iran. Thus they have tried to contact Sanaray to check if there are any services for European outsourcers that want to open a branch in Iran. But Sanaray's bureaucracy and difficult conditions (as Parsa calls it) has terrified them and they haven't gone forward to contact Sanaray. The firs terrifying point in Sanaray's condition has been the obligation to obey the Islamic lows of business and commerce. Of course it is very natural for a branch of a company to be obliged to work according to the laws of the country where it is located. But the name of 'Islamic low' is terrifying enough for those who have had an experience with Islamic laws, to make them run away from Iran. So their final conclusion has been this result that finding business partners and connections through friendship and personal acquaintance, is by far easier and more reliable than working with Sanaray.

Shahram and Parsa are from that group of Iranians who believe that if they are going to outsource somebody and pay him some money; they prefer to pay the money to an Iranian. Yet, as we saw, they are afraid of working with the government. They believe that the government should make an environment in which foreigners dare to enter and bring in their money. Foreign companies don't feel safe and comfortable in Iran now, so they don't approach it. Worst of all, lack of stability is added to lack of proper laws and has made Iran one of the riskiest places on the world for investment.

This case is a very good example of Iranian expatriates who don't want to cooperate with the current government, but they work with another Iranian and pay him directly. This method is a very good pattern for other Iranian expatriates to help development of the Iranian software industry, but it is not possible for everybody. First

of all they are owners of their job and don't work for somebody else, so they can act as they will without having to content their boss. Secondly, sending money from Norway to Iran is free and has no problem. The most important point in this example is the small volume of the projects that enables both sides to work with each other on a friendly basis and without relevant bureaucracy. It is hardly ever possible to connect to sides in two different countries so simple, in case of a big project. Yet, this case is a very good pattern for beginning the job, and developing it gradually afterwards.

7.2.10 Case 10: Interview with Shiva

Shiva is a 31 year old Iranian software engineer who has come to Norway about eight years ago. Her husband is also Iranian, but he has been in Norway from early childhood. She has finished her studies in informatics in Norway and got her bachelor in 2003. She is now working in a software producing company, which we call it N Co., for less than a year. N Co. has begun its work from 1999 and its specialty is making web pages, but recently they have begun another very beneficial job and that is producing 'Interactive TV' Formats.

She works both as project manager and project coordinator there. The coordinating position is needed as some projects are common with other companies. For example in interactive TV format projects, they cooperate with another company which is specialized in interactive media.

The company sells many of its interactive TV formats to foreigner TV channels like USA, Canada, Dubai, Britain, China, and Malaysia. As interactive TV format has been innovated in northern European countries, TV companies often refer to Scandinavian companies to buy such systems.

In answer to this question that whether they need a native member in their teem when they work for foreigner TVs, Shiva says that they have no or very little problems when they work for companies that their staff ca n speak English, according to language and cultural issues. She adds that anyhow, there is always somebody in the other side that cooperates with them and solves such cases and answers all questions. Also, according to the ease of communication through internet, there is no need of presence of a native person in their team. Yet in case of working for Dubai, Shiva has been the reference for some questions about Arabic alphabet and writing direction and such things.

About working with Iranian TVs, she says that there is no problem to make an interactive TV system for any Iranian TV In case they apply for it, but they have had no deal with Iranians yet.

About outsourcing she says that their job is not so much developed that they need any outsourcing yet, and their present personnel answer the company's needs.

Finally she claims that as an Iranian she wishes to go back to Iran and live there and give a service to her homeland, but not under present situations. She also reminds that her husband is more Norwegian rather than Iranian, as he has grown up here and he prefers to live in Norway rather than Iran.

In this example we distinguish the outstanding role that Iranian staff in the Western companies can play as a connection between their own company and Iranian customers or as we are more concerned, Iranian outsourced companies. Another point was the role of the family members in the services that an expatriate can give to his/her own homeland. An emigrant should make his/her family ready and get their agreement with what he is going to do for his homeland at present or in the future.

7.2.11 Case 11: Interview with Aleksandra

Aleksandra is a 32 year old female software engineer who comes from Serbia. She has got her bachelor at her homeland and has come to Norway about five years ago for a temporary job as a developer in a game producer company which we call it FC. Later on she has been fixed in that job and has stayed here thereafter. She has recently married to a Norwegian man.

As a Serbian who lives in a more prosperous country, she plans to establish a software company in Serbia; but it won't be possible in near future. Anyhow she reminds that she has married to a Norwegian and so she is not sure of what will happen in the future. Yet, at least she can have a software company here and outsource few people in Serbia, and pay them a little bit more than what they get normally. Some European companies use programmers in Serbia nowadays, so it is not new there. She cannot do it now, as FC Co. looks for people who stay in Oslo and is not interested in far away sources.

In this case, again we see that family is an important factor that may conflict with playing a role in development of the homeland's software industry.

7.2.12 Case 12: BIHE, an example of remote education

Baha'is in Iran have been deprived of higher education ever after the cultural revolution in 1981. So, from the late 80s, they have tried to establish some institutions in order to compensate the lack of higher education for their young generations. Baha'i Institute for higher Educations, BIHE, is a very successful result of these efforts. This institute is a university that presents more than 10 majors including Persian literature, chemistry, civil engineering and software engineering. Despite diverse courses and a few hundreds of students this university has no dedicated building. All classes and administration rooms are distributed between personal houses and rented rooms in different places all around Iran; but mostly in Tehran of course. On 1998,9,29 the agents of the Ministry of Information attacked the institute's distributed sites and arrested tens of its administrating staff who where totally volunteer Baha'is. They also confiscated what ever they could. Thus the institute is a kind of underground now.

Under such circumstances, a very big problem for BIHE has always been recruiting proper and up-to-date scientific staff; a big problem for Iranian universities that even governmental and private universities suffer from it. Thus from the early 2000s BIHE

has tried to establish an internet based network to recruit volunteer university professors from all around the world. In this regard I interviewed one of the administrative staff, and two of the remote professors, a British in Oslo and an Iranian in New Zeeland.

The remote instructors are responsible to do everything that a normal instructor does; designing the course plans, correcting the homework and tests, and even giving lectures and teaching directly are among their duties. But the quality of the connection is not so good yet to let them do all these as good and as efficient as possible. The connection between students and instructors is established through many online features like E-mail, voice mail, online chat, sending lecture notes, online forums, conference calls, etc.

The biggest problem here, that all interviewees mentioned, is still the low level of English language skills among the students. Ramez, an old classmate of me in BIHE and a present constructor of an informatics course, says that the students are getting better and their English language improves rapidly. "They are better now than what we were at that time" he believes.

The other problem that Ramez mentions is the lack of correspondence between him and his counterpart in Iran. He says that they have had no contact with each other and they have done two separate jobs during the first semester. On the other hand, James, a British instructor of English language says that they are five persons who work with each other in the same group and they have a very powerful and efficient team work. They have also met each other once or twice in USA during the first year. It seems that foreigners can work in a group by far better than Iranians.

Another problem is lack of computer skills among both students and instructors, that doesn't include our area of interest, software engineering group. Yet, difficulty of adapting to the system and lack of motives to follow the course online, has reduced the efficiency of this system for the first year.

My contact in the administrative staff said that they expect to upload all BIHE courses online by 2008, using a Unified Course Structure. Ramez believes that in order to implement this system completely, BIHE needs a big investment to buy all needed equipments; and thus motivate the students to use the full capacity of the system (in the same way that we see in other universities all around the world).

As this system has begun working from the autumn of 2005, it is still too early to evaluate and review it. It is just obvious that the system is still too young to work properly.

This example alone, magnifies a few important problems that we have mentioned earlier: lack of English language skills, lack of team work abilities and lack of the internet usage culture. All these issues have limited the Iranian software and IT industry too. Iranian diasporas can play the best role in reducing these hindering factors. All Iranians that I have met in Europe can speak both English language and the local language almost as good as their mother language; even their accent is better than many other nationalities. Many of them have worked in western companies and have extremely good team work skills. And finally none of them is unfamiliar with the online services and usage of internet. They can transfer their knowledge and abilities to their fellowmen in many different ways; including direct teaching, remote teaching,

making websites, making TV and radio programs and above all, being a good pattern in front of others. The last mentioned method, is the best way to transfer a positive culture.

7.2.13 Case 13: SOS Iran, an example of vision for future

S.O.S. Iran is an opposition group established in Los Angeles, USA by Dr. Iman Foroutan, which has gathered hundreds of Iranian experts from all different scientific and technological fields in its well-organized network. Its members reside in all countries of the world, even Iran. The goal of this group is preparing transition and fast reaction programs to take over the control of vital activities in Iran, as soon as the Islamic regime falls down; in order to prevent of the happenings that took place in Afghanistan after Taliban and in Iraq after Saddam, to repeat in Iran.

I tried to correspond with them through E-mail, but didn't get much information finally. The only answer that I got was their conforming that they have also a plan about controlling IT and telecommunication centres right after the expected chaos; but they didn't explain about that plan. I found the information from their official website and from their TV programs on satellite TV channels [66].

The important result that we can get from the case of S.O.S. Iran, is the fact that Iranian expatriates should be ready for the future possible activities. As we saw in case 8 about Mr. S., there are a group of diasporas that desire to do something for the software industry of Iran, but due to several mentioned reasons they can not do anything at present. In cases 2 and 3 we observed an American company that has almost the same conditions; but is training a team in Iran, and is waiting for the future possibilities. Shahab in case 6, believes that no activity should be done before the change of the regime. Nariman in case 7, has tried, but problems have stopped him. Shahram and Parsa in case 9, have established the connection and are planning to develop it. Shiva and Aleksandra have married and don't feel free to plan for the future alone. They cannot disregard their family's interests and benefits. Regardless the current political conditions and in spite of all difficulties and threatening dangers, BIHE has begun to teach and train its students with the newest methods and materials; using the enormous potentials of diasporas. And finally S.O.S. Iran is ready to react spontaneously in case of urgent need.

All these cases remind us of the importance of a vision and planning for the future, even in personal level. We should not forget that in the Software Export Success Model, vision and strategy locate at the most fundamental level. Whoever that wishes success in the future, should act from today; and any action must begin with a determination oriented vision and a realistic planning.

Chapter 8: Discussion and Conclusion

Revolutionary advances in information and communication technologies have opened up extraordinary opportunities to accelerate social and economic development for the developing countries, and among them for Iran. Another very important impact of this IT revolution is that they create a pressing policy and investment agenda both to capitalize on new opportunities and to avoid the deterioration of international competitiveness. Although Iran has not shown up successful in any of these fields, all evidences show that this country has a very powerful potential to gain an important share in such international challenges.

The pressing reform and investment agenda dictated by the information revolution aims to move countries into a different kind of economy -the information economy- where information is the key factor of production. Trade and investment are global, and firms compete globally on the basis of knowledge, networking and agility. This agenda also leads countries into a new type of society-the information society-that is quite different from an industrial society [12]. An information society is better formed, more competitive, more democratic, more able to address individual needs, less centralized and friendlier to the environment.

But there is a transformation period to pass from one era to the other; and Diaspora can help to pass this period and lubricate the movement to a very high extent. It is because they have established their roots in both the Iranian traditional society and the new modern information societies, and know the needs and characteristics of both sides. Thus they are able to adapt both conditions and match old needs with new methods. Their role can be compared with the role of detergents in solving oil in water. A detergent substance has both an OH end to be solved in the water and a CH end to solve oil and fat, and can cause the oil to be easily solved in the water.

This group know the language, culture, way of living and thinking system of both societies (Iranian and Western), and can easily act as the representative of each side in the other one. The large number of the countries that Iranians have immigrated to them and the diversity of the new cultures that they have adopted/adapted, enriches this potential role that they can play to develop their homeland in cultural and economical aspects and lubricate the path from tradition to modernity and from old society to in formation society. They are the best model for adapting differences with each other.

Though, unfortunately, the same force that has made them to exit their country and scattered them around the world, is still in power and hinders them of doing any favor to their homeland. In a world that is going rapidly towards freedom, development and welfare, maybe the most undesirable condition is loss of those who can be the pioneers of freedom, development and welfare [20].

Yet, not all doors are closed to Iranian expatriates to share reconstruction of their homeland. Hereby, as the conclusion of this research, we can recommend a few ways in which Iranian diasporas can serve their country to develop its software industry.

It is inevitable to mention here that it is not actually possible to fulfill all these actions in presence of the Islamic republic in Iran, because of this government's destructive and hindering policies. While, of course, it is not necessary to wait for the change of regime to be implemented all of them. It is not in my authority to decide which one is practical to be done, even now; and which one is not. It depends on every single person's mentality, goals and attitudes to determine which one is practical and which one is impossible or at least useless to do.

In fact, the Iranian government has to create a climate in which expatriates can work and dare to have contacts with Iran. Otherwise they are not able to play their possible role, and the results of this research will not be completely useful. Development of Iran requires turning the current governmental hostility into people-friendliness and world-friendliness. As all efforts to implement reforms in this regime have been useless, many analysts believe that there is no other way than a regime change.

It is not relevant to this research to discuss which one of the abovementioned solutions is better or more practical. But, while the government has to improve the conditions and encourage all Iranians to cooperation; people and particularly expatriates should discriminate between political issues and giving a service to their country. During the case studies in chapter 7 I have tried to show that regardless of the political situation, there are always alternatives to take a part, even though small, in developing this country.

The following activities ire the answers to the question of this research; these are the roles that Iranian diasporas can perform to develop the IT and software industry in Iran. It may seem that all Iranians or even foreigners are capable of implementing most of these roles; but as said earlier, diasporas have the priority that they are connected to both Iranian and Western sides.

1. Transfer the knowledge and technology

Transferring the knowledge and new technologies to promote the scientific ability of Iranian IT society, is one of the most urgent needs of the Iranian IT industry. As we saw in chapter 7, and Nicholson and Sahay point out too, Iranians suffer lack of project management techniques to a very high extent.

Even laws and rules are a field in which Iranians need other countries experiments to develop both IT industry and their export; because Islamic republics rules are too rigid and antiquated to let developing bounds with the rest of the world.

2. Preparing money resources and assets for IT industry

Totally, as a constant rule after the revolution, the route of capitals is towards out of Iran. Under such conditions almost all sectors suffer from shortcoming of investments and many companies and industries go bankrupt every year. On the other hand, the same as we saw in case 1 in chapter 7 about Vietnam, the investment conditions in Iran is so unsafe that even those who gain money from transaction with Iran tend to keep their money out of that country and do not return it to Iran.

So it is very important that Iranian expatriates try to work with and help their nation; even in case they don't trust the government and don't want to help them, as we saw in cases 9 of chapter 7. Te money that enters the country this way can be of great importance for Iranian economy and industries. As stated earlier, it is estimated that Iranian immigrants only in California and Dubai, have more than 1000 billion dollars.

3. Compensating the lack of human recourses and specialized staff

Due to the high rate of brain drain, lack of well-trained and experienced human recourses and specialized staff is one the countries most important problems; especially in case of IT industry. Although the number of IT graduates has raised up during the last decade, but they are not capable of leading big projects and new methods of group working. Iranian it experts behave mostly like an army without generals.

Vise versa there are many successful Iranian project managers and university professors in western countries that can both serve Iranian software industry and IT companies, and train the new generation of IT managers and experts inside Iran.

4. Promoting the culture of using IT based services in daily affairs

On of the biggest limitations of software industry in Iran is the lack of extensive usage and appreciation to IT from the majority of the people. Although the government has planed to increase then umber of internet users and promote the culture of using IT, still there is no guaranty that Iranians be able to use the internet as effective as it is used in developed countries, in near future.

Iranian diasporas with vast knowledge and experiences of what is possible to do with computers and intelligent machines that are connected to the internet, and totally through the IT innovations, can bring the culture of using IT for their fellowmen to ease their lives and make impossible jobs possible for them. As Kovan pointed out in his interview, it is not a 'can' for diasporas, but it is a 'must'.

5. Importing the culture of obeying the rules

This item may seem odd and irrelevant with software industry, but the fact is that one of the most serious problems that Iranian community suffers from is corruption, illegal ways of doing all activities and disrespect to the low. These problems have dumped all progress and once removed or weakened will let the whole country to come to order and healthy economy.

Until now many negative habits have entered Iran from western societies. Yet, one of the most precious services that Iranian expatriates can give to their former fellowmen is teaching them the way that they live in their new life: obeying and respecting the law. I remember a very big industrial complex that its owners didn't want to mechanize their systems, because computers were not easy to cheat on and they might reveal their economic wrongdoings and tax escapes.

6. Making reform in the educational system of IT and software courses

Iranian educational system needs such a reform according to the new goal oriented educational systems in developed countries, especially in the field of IT and software

that any material or method becomes obsolete in five years. Nowadays the software education system in Iran is comparable with that of eighties and doesn't follow the goal to deliver professional IT experts to the market; while this intention is achieved to a much higher extent in western universities.

Under such conditions, so many Iranian professors teach in the best universities of USA and Europe and other developed countries that it is symbolically believed that the number of Iranian university professors and specialist doctors only in south California is more than the total number of them in Iran. So, as one of their best services, Iranian IT professors, can and must bring the newest methods and materials for teaching software to Iranian universities.

7. Implementing strategic research in IT-related areas

During my research for this thesis, I met or heard of many Iranians working on similar researches about Iranian IT or Iranian diasporas; but not a single one of them is in Iran. They are all, just like me, in European universities. Also as stated in case 5 in chapter 7, this country lacks such researches seriously. Although there is more than one "strategic research center"s in Iran, they are all interested in political issues and other economical activities; and none care for IT and new technologies. As a proof for this statement we can see that Nicholson and Sahay's traveling to Iran, shows that there has been nobody else in that country to implement the research that they have done.

Implementing such researches is one the best services that Iranian professors and students in western universities can do for their homeland.

8. Presenting Iranian software industry in the international markets

This can be done through preparing software fairs, representing Iranian companies and other methods. In the absence of a powerful software export organization in Iran, Iranians can find proper partners among each other on the two sides of the border; and the foreign one sell the IT products of the internal one. This is the successful model of Iran's carpet and fruit exportation. Afterwards these small joints can join to each other and shape a national organization of software exporters.

9. Finding foreigner markets for Iranian products and services

This one is the natural outcome of the previous item; and the explanation is like what was mentioned above.

10. Establishing the linkage and trust between Iranian and foreigner sides

As we saw in cases 7 and 9 in chapter 7, Nariman, Shahram and Parsa had worked with Iranian partners just because of bilateral trust; and had sold the product to a third company in Norway. Otherwise they were not able to fulfill the contract without extra bureaucracy and excessive time and expense overheads. It was also impossible for the Norwegian company to find and trust the Iranian side without the help of the diasporan connection.

Now that the Iranian politicians try to destroy the world's trust to Iranians, expatriates are responsible to revive and strengthen their trust in Iranian software industry.

11. Reducing the negative image of Iran among foreigners

As said in above paragraph, Iranian expatriates have to show the positive face of Iranians and their culture. As Nicholson and Sahay point out in their article [3], the amount of negative information and promotion on Iran has hindered development of their software export. Thus it is one of the best roles for Iranian diasporas to clarify and enlighten the image of their country for the rest of the world, using their good fame and important positions.

12. Teaching new management methods to the working force

As seen in case 2 in chapter 7, and mentioned in Nicholson and Sahay's article, project management is one of the weakest points of the Iranian software industry. So it is necessary for this industry to learn the new efficient and correct management methods from foreigners. Iranian managers with the common language and common culture and more powerful motives[72] can fulfill this important job better than the others.

13. Remote management

One of the methods to transfer the abovementioned knowledge is through remote management; as discussed in chapter 7. for the reasons that are explained in section 7.1.3, and I don't repeat them here, Iranian diasporas are the best candidates to implement this kind of management.

14. Teaching the methods and culture of team work

As stated in case2 and 3 in chapter 4, "how to implement group work" is still a strategic knowledge in Iran. Traditionally, Iranians tend to work alone and make others just to obey them. Nicholson and Sahay quote from Tayeb that "*Iranian organizations do not appear to be a fertile ground for participative decision making approaches*". We also saw an example of the lack of team work between only two instructors in a group in case 12 of chapter 7.

Again, Iranian expatriates with their bilateral roots and interests are the best candidates to teach group work to their fellowmen in both decision making and production process levels.

15. Establishing NGOs to improve their contact with Iranian companies

This item is explained in subsection 6.2.2 of chapter 6. As we saw there Iranians of Orange County have established NIPOC, which is now even used for more than "professional" intentions. But maybe according to the US embargo in Iran, an organization in the USA cannot do much in order to cooperate with Iranian companies.

Thus it is more suitable for European software activists who have no legal problem to work with Iran. As Nariman said in case 7 of chapter, there has been a gathering like NIPOC in Oslo too; but its dependence to the Iranian embassy has prevented its progress and success. So it is important for any gathering of Iranians to be completely

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[72] It is obvious that everybody works for money. But Iranian expatriates that teach new and important technologies to their fellowmen, may consider the servise aspect of the job, more than the economic aspect and work more efficient.

independent from political organizations like the embassy or any opposition group; and remain 100% professional.

16. Discriminating between politics and serving the homeland

The wrong political attitudes of Iranian governments during the last 3 decades and their hostile confrontations with the rest of the world have imposed several damages, and above all economical damages, to Iranian citizens. Under this condition, selling IT product to foreign customers, not only makes a good income for the producer, but also improves the total economy of the country. Thus some Iranians believe that we shouldn't deal with any Iranian, lest we help the stability of the regime.

I have tried in all parts of this research to disagree[73] with this idea and show that there are always other alternatives to help the country and its people, without dealing with the government directly. Thus, this research recommends all Iranian expatriates to disregard political considerations and take a part in development of their country.

17. Training their children as Iranian and not foreigner

The second generations of immigrants always get the color of their new country more than that of their parents. The children and grand children of Iranian expatriates around the world, can have the same value for Iran's development that their parents have; provided that they care for the old country. I have seen some Iranians that don't speak Persian with their children and teach them nothing or very little about their mother country. These children get their information about Iran from the same negative propaganda that we mentioned earlier. There is a very little probability that these kids care for what happens in Iran in present time and in the future.

On the other hand, many Iranians teach Farsi language and Iranian cultural elements to their kids and make them fell more Iranian than anything else. This group is more probable to contribute in rebuilding Iran in the future; and in case they intend to contribute, it is easier and more practical for them to work with other Iranians. Parsa in case 9 of chapter 7 is a very good example of this group.

"Westernizing" of the second generations was one of the "should not"s in relation of the topic of this chapter. Here are a few other points that should be avoided.

18. Encourage other Iranians to exit the country

This is a very personal affair and nobody can recommend others to remain in their birthplace or leave it. But according to the development point of view, emigration of the elite members of the community from Iran, hinders development and intensifies the problem of brain drain. Thus, encouraging the Iranians to emigrate, is a help in the reverse direction of development.

19. Taking out the capitals and assets and investing them in other countries

Again as mentioned above, nobody can recommend the owners of capitals to keep them in Iran; as it is one the most improper places on the Earth for investment. But

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[73] To mention the reasons of my disagreement with this opinion does not comply with the goals and theme of this thesis.

finding a beneficial way of investment in Iran is not impossible and from the developmental point of view is recommendable.

20. Cut off all connection with the mother land

The last personal affair that is not recommended is cut off al connections with Iranian companies and industries. As mentioned above, it is not impossible to find a proper way to deal with an Iranian software company or with individual programmers; as we saw in a few examples of chapter 7.

So the final word is this: if an Iranian expatriate determines to help development of IT industry in Iran, he can always find a way to do it. I presented only a few examples here, yet many other ways are possible.

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