



A Study on the Roles of Virtual Networks and Diaspora in Elite Brain Mobility and Circulation: A Mixed Method Study

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ABSTRACT

Background: Brain mobility is an alternative word for brain drain. Today, brain drain is considered as a major loss that has a very harmful effect on developing countries. The brain movement, and inverse immigration depends a lot on policies adopted in the countries of origin. This research was conducted with the aim of investigating the role of virtual networks and diaspora in elite brain mobility and circulation in Iran.

Methods: This study was conducted using a mixed-method approach based on sequential exploratory strategy in 2018. In qualitative section a semi-structured interview was conducted with 19 former graduates who had returned back to Iran. The theoretical saturation was reached via a purposeful sampling and maximum variation by applying conventional content analysis method processes. In the quantitative section, a questionnaire was developed and its validity and reliability was tested and verified for data collection. The questionnaire was distributed among a random sample of 285 physicians out of a target population of 1100 physician returnees. Only 158 participated in the study by returning the completed questionnaire. In addition, the data were reviewed by applying descriptive-survey method, and content analysis was used to analyze the collected data.

Results: Regarding the theme of inclusive elite brain mobility and circulation, the results are indicative of the existence of 18 basic themes, and 4 organizing themes including: cultural strategies, educational and research strategies, management strategies, social and economic strategies, and 1 global theme. The Basic Islamic Cultural Requirement theme (with a factor of 0.83, $P < 0.001$) is the best descriptor for elite brain circulation and movement.

Conclusion: Developing countries not only should send their elite medical graduates abroad to gain professional experiences, but also they should try to motivate them for inverse migration to their homeland by creating and promoting Diaspora networks.

Keywords: Elite, Brain circulation, Reverse migration, Diaspora, Shiraz University of Medical Sciences

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Introduction

Today, medical scientific activities are not simply limited to the territorial framework of a country. The term “brain mobility” as “double-sided international mobility of brain circulation” or elites, refers to the internationalization of medical profession. Medical elite migration has two effects on human resource formation and economic growth (1) the one-sided brain drain and (2) the double-sided mobility of the brain. The brain drain is not a concern for developing countries alone. Even developed countries have realized that they have to work on attracting their nationals from abroad (reverse migration) and also maintain foreign medical graduates. Emigration (temporary living in another country) and Immigration (to come into another country to live permanently) are popular around the world. If elites emigrate from developed countries, instead, several students from developing countries will replace them. But in developing countries there are no such balances, and when elites leave the country, nobody will replace them. In Iran if an elite member returns to Iran, after a while he/she will return to the country where he/she received their higher education (3-8).

Statistics show that out of a total of 366 Iranian student scholars who were sent abroad from 1997 to 2003, about 39 percent (145 people) did not return to the country (9), and Sohbatihah et al (2013) refer to the activities of 141 Iranian faculty members in different fields at American universities(10). In recent years, in most Iranian universities, the International Relations Department has been set up to attract overseas elites, but the number of people attracted to these offices is not very high. Over the past two and a half years, 1,100 people have returned. These statistics show the importance of the subject (11).

In the discussion of the importance of the elites' return, it is possible to increase the level of income and job satisfaction at the micro level (supporting the family and transferring knowledge, skills and new ideas at the workplace), at the intermediate level (promoting social, economic and political

changes through the creation of business and new jobs) and at the macro level (12) (the transfer of technology and experience-direct investment and the start of an entrepreneurial activity) (5, 13, 14)

Brain drain has three effects (direct effect, induced effect, and feedback effect) on skilled human resources (13) immigration can be useful if it focuses on gaining experience, training and upgrading skills, but if immigration is permanent, it leads to an additional cost for alternative employment (15). The feedback effect refers to the two aspects of the reverse immigration of the elites and the Diaspora network (information and knowledge exchanged between scientists residing abroad and scientists residing in the country with the help of the Internet and virtual networks in the shortest time). Countries such as India, China, Singapore have benefited most from the feedback effect and have used the brain drain problem to “boost the brain” and have benefited from the positive points of increasing revenues, transferring capital and expertise from Western Countries (16-20).

Governments have begun various policies for reverse immigration, but they have gained little success because of the benefits of elitist countries such as facilities for research, investment, improving regulation, recruitment, social security and the protection of the immigrant family. Political stability, the possibility of professional progress, working environment conditions, job mobility, access to modern equipment, and promotion of living standards in these countries are the factors behind the return to the country of origin. In addition, the desirability of the economic and social conditions of immigrants in the destination countries is influential in the elite decision making to return. For example, immigrants with a good social and economic situation in the host country tend to be less likely to return (12-13).

An increase in the length of the visa time for international researchers after the September 11 events, increasing costs of studying in advanced countries, the growth

of international knowledge in countries such as China, Singapore and Malaysia, economic crises, increasing currency value, the use of study sites, emotional and family relations, and some negative experiences, such as the negative experiences of Chinese students from educational providers, irregular American policies (10), cause the return of some elites to their motherland (21-23).

Improving the quality of medical infrastructure and the use of advanced technology and paying attention to research and the educational system, creating a diaspora network for scientific advancement and close communication between resident and non-resident scientists, job and career opportunities, family considerations and government support, providing citizenship to Indians living in America, economic stability, organizational structure evolution, livelihoods and cultural support, supporting startups and health tourism in India, and therapeutic tourism are India's policies for reversing immigration (7, 23-25).

With the design and introduction of the so-called "thousand talents", China has been trying to persuade talented students and professors to return to the country after graduation. The program earns a relatively successful achievement by allocating very good wages, tax incentives and housing, attracting elites as university professors and administrators (26), giving them a high degree of scholarship, allocating research budgets, and creating a chance for the leadership of a research team. In addition, China has set up more universities and research institutes for further success, Creating packages of incentives (facilitating administrative affairs for investment, tax breaks), Official teamwork of embassies for organizing scholars outside the country, and the financial support of those who intend to return. In addition, other factors such as improving the flow of information about these opportunities in China, inviting scientists to visit universities and research centers, changing the rules, political and economic stability, employing young and elite human

resources and private-sector cooperation for research, innovation and entrepreneurship, strengthening higher education institutions with a strong, credible and renowned background, economic prosperity and the establishment and strengthening of diaspora networks have facilitated and accelerated the process of elites returning (8, 22, 27).

Creating a top scientific pole and inviting researchers and non-residence graduates, investing in foreign recruitment and scholarships (13), high international university ranking and competitive prices are the advantages in Singapore (28). Similar approaches are used in Latin America, Mexico, Columbia (29) for reverse migration. Unfortunately, graduates from developing countries are still eager to live abroad, and as soon as they experience it, they are rarely ready to return to their country. The return of elite immigrants is a return of skills and experiences. Along with immigrants, there are ideas and experiences that can build an organization or revitalize national organizations. Reverse immigration leads to a better transfer of technology and entrepreneurship. Because they are active in the context of their national culture and language for the discovery and dissemination of national knowledge. Therefore, the first step to gain skilled human resources in a country is to retain the medical elites. Secondly, it requires special strategic policymaking, improved social, cultural and economic life in Iran to attract more Iranian medical elites.

The main objective of this study was to investigate the role of virtual networks and diaspora in circulation of elite brain mobility and to identify and formulate strategic policies for more effective brain mobility and reverse immigration of medical elites to Iran in 2018.

Materials and Methods

This study was conducted using a mixed-method approach based on sequential exploratory strategy. In qualitative section a semi-structured interview was conducted with 19 former graduates who returned back to Iran at Shiraz University of Medical

Sciences (SUMS) and collaborated with the international relations department. After obtaining official permissions and willingness of the interviewees and taking into account three criteria of (experience of study and employment abroad, cooperation with the International department of (SUMS), and optional return to Iran) a total of 19 participants were chosen (11 women and 8 men with PhD degrees, 17 were married and 2 were single). Each interview lasted between 60 and 120 minutes. Interviews were recorded and typed ... The transcripts of the interviews were first read carefully and the keywords were extracted. After defining the themes, a meaningful relationship was established between the themes and the categories and the final agreement was reached by the research team.

188 initial themes were obtained from the interviews, which were then extracted several times by reviewing and categorizing similar themes and revising 20 themes around the base content. Via a purposeful sampling and maximum variation by applying conventional content analysis method processes the theoretical saturation was reached. The validity was confirmed by (two non-collaborators) experts who were knowledgeable in thematic analysis and the reliability was estimated at 0.89 via Holistic coefficient.

This procedure confirmed the existence of 18 basic themes, and 4 organizing themes including: cultural strategies, educational and research strategies, management strategies, social and economic strategies, and 1 global theme

In the quantitative section, a 4-option Likert scale questionnaire was developed and its validity was authenticated by 15 experts in management fields. By using the content validity ratio (CVR) table, the questions with $CVR < 0.49$ were omitted and reliability (with Cronbach's $\alpha = 0.89$) was tested and verified for quantitative data collection.

Based on Morgan's table the questionnaire was distributed among a random sample of 285 physicians out of a target population

of 1100 physician returnees. Only 158 participated in the study by returning the completed questionnaire. In addition, via application of descriptive-survey method the data were reviewed and content analysis procedure was used to analyze the collected data. Finally, Confirmatory factor analysis was used to analyze the data by using Mplus Version 7.4 and SPSS software.

Results

In qualitative section, thematic data were extracted from the results of the interview. The obtained data were analyzed through thematic analysis, then clustered in three basic, organizing and global themes, and a thematic network was organized (ATTRIDE –STIRLING MODEL).

Regarding the theme of inclusive elite brain mobility and circulation, the results of the qualitative section are indicative of existence of 18 basic themes, and 4 organizing themes including: cultural strategies, educational and research strategies, management strategies, social and economic strategies, and 1 global theme (Table 1).

In the quantitative section, 158 questionnaires (71 women and 80 men and 7 unspecified) completed the questionnaire. The estimated values in Table 2 (factor load, critical values, and significance level) indicate that the factor loads referring to the basic contents are representative of good status; in other words, the correlation between the organizing content and the components of these themes is within the limit. As a result, the instrument of validation has a necessary confirmatory factor (Figure 1).

The results in the quantitative section showed that the theme of the foundation for emphasizing and strengthening the infrastructure of Islamic culture - religious beliefs - has obtained the most elaborative power in the model of elite brain movement and mobility.

The theme is to Emphasize and strengthen the infrastructure of Islamic culture - religious beliefs with factor of 0.83. Representing the content of organizing

Table 1: Clustered thematic analysis: basic, organizing and global themes of inclusive circulation and brain mobility of elite medical physicians in Iran

| (Global theme) | (Organizing themes) | (Basic themes) |
|--|-------------------------------------|--|
| inclusive circulation and brain mobility of elite medical physicians in Iran | Strategies | -Strengthening the culture of helping a fellow countryman - a sense of philanthropy. |
| | Cultural | -Enhancing Iranian Culture. -Strengthening emotional ties and strong relationship with family and community. -Emphasize and strengthen the infrastructure of Islamic culture - religious beliefs. |
| | Management | -Emphasis on Intellectual Property Rights. |
| | Solutions | -Granting scholarship and Obtaining Commitment to Iran. -Eliminating government funding after graduating scholarships and receiving a non-returning fine. -Reduce administrative bureaucracy (Facilitate Entry Process - Facilitate Equalization of Qualifications). -Calling and inviting non-resident specialists to return and cooperate with Iran. -Solving problems related to the military services of Iranians residing abroad. -Facilitating the Return of the Elite Children - Supporting the Immigrant Family. -Strengthening the infrastructure for rotational and circular immigration of specialists. |
| | Educational And Research Strategies | -Development of Diaspora: (the specialist is not in his native country, but shares his scientific knowledge and experience via virtual networks and the Internet with his colleagues in the native country). -Ensuring the continuation of scientific and research collaboration with foreign professors after returning to Iran. |
| | Economical-social solutions | -Economic support for doctors and elites, providing financial incentives. -Establishing the required foundation for the transfer and investment of non-resident professionals in Iran. -Establishment of foundations for acquainting a non-resident Iranian specialist with improvements and infrastructure developments. |
| | Economical-social solutions | -Creating opportunities for Entrepreneurship - Knowledge Based Economy - Startups - Novice Companies |

cultural solutions, Reducing administrative bureaucracy (Facilitate Entry Process - Facilitate Equalization of Qualifications) & strengthening the infrastructure of rotational and circular immigration of specialists with factor load of 0.66. management solutions, ensuring the continuation of scientific and research collaboration with foreign professors after returning to Iran with factor load (0.70), identifying the content of the educational & research strategies, establishing the required foundation for the transfer and investment of non-resident professionals in Iran with factor load 0.76 the most effective

contents were economic and social solutions to correlate the above mentioned subjects (Table 2).

Discussion

Today, we are witnessing the immigration of skilled and educated human resources who travel to advanced countries with the state or personal budget, but do not return to the country after graduation. In order to get the updated knowledge, it is very valuable to send the students to the most famous universities. However, one needs to pay special attention to restoring skilled human

Table 2: Estimate Factor load, S.E. Critical amount, with P-Value <0.001 of Basic Themes of inclusive circulation and elite brain mobility in Iran

| Organizing themes | Basic themes | Estimate factor load | S.E critical amount |
|-------------------------------------|---|----------------------|---------------------|
| Cultural solutions | Strengthening the culture of helping a fellow countryman - a sense of philanthropy | 0.65 | 0.05 |
| | Enhancing Iranian Culture | 0.50 | 0.07 |
| | Strengthening emotional ties and strong relationship with family and community | 0.59 | 0.06 |
| | Emphasize and strengthen the infrastructure of Islamic culture - religious beliefs | 0.83 | 0.04 |
| Management Solutions | Emphasis on Intellectual Property Rights | 0.62 | 0.06 |
| | Granting scholarship and Obtaining Commitment to Iran | 0.56 | 0.05 |
| | Eliminating government funding after graduating scholarships and receiving a non-returning fine | 0.49 | 0.05 |
| | Reduce administrative bureaucracy (Facilitate Entry Process - Facilitate Equalization of Qualifications). | 0.66 | 0.06 |
| | Calling and inviting non-resident specialists to return and cooperate with Iran | 0.62 | 0.05 |
| | Solving problems related to the military services of Iranians residing abroad | 0.63 | 0.05 |
| | Facilitating the Return of the Elite Children - Supporting the Immigrant Families | 0.64 | 0.05 |
| | Strengthening the infrastructure for rotational and circular immigration of specialists | 0.66 | 0.04 |
| Educational and research strategies | Development of Diaspora: (the specialist is not in his native country , but shares his scientific knowledge and experience via virtual networks and the Internet with his colleagues in the native country) | 0.55 | 0.07 |
| | Ensuring the continuation of scientific and research collaboration with foreign professors after returning to Iran | 0.70 | 0.06 |
| Economical-social solutions | Economic support for doctors and elites - providing financial incentives | 0.70 | 0.05 |
| | Establishing the required foundation for the transfer and investment of non-resident professionals in Iran | 0.76 | 0.04 |
| | Establishment of foundations for acquainting a non-resident Iranian specialist with improvements and infrastructure developments | 0.67 | 0.04 |
| | Creating opportunities for Entrepreneurship - Knowledge Based Economy - Startups - Novice Companies | 0.70 | 0.05 |

resources. International management of human resources requires a specific strategy by governments and an opportunity to transfer and share valuable experiences that promote community development and progress in all aspects, and it is necessary to consider the returnees as a valuable asset. Therefore, in this research, a combination of the subject matter and a researcher-made questionnaire were examined with a new approach and a content-based analysis method. The results

of the qualitative section were confirmed in Table 1 after approval. In the quantitative part of the content, the emphasis and strengthening of the Islamic culture infrastructure with a factor of 0.83 reflects the theme of organizing cultural strategies that had the greatest power of convergence. The interviewees referred to their beliefs and religion, and the majority of them suggested that they would not like their children to grow in a foreign environment and immediately returned to the country upon

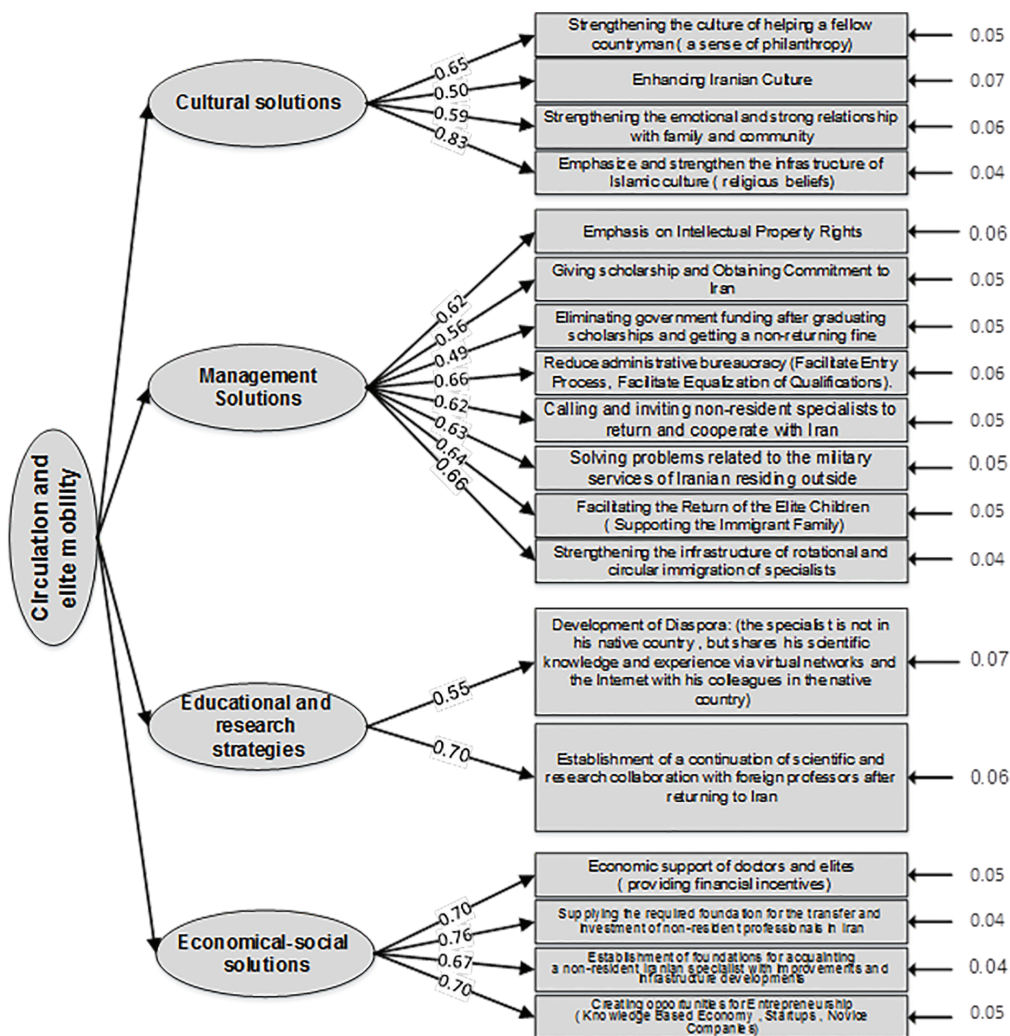


Figure 1: Estimate Factor load, S.E. Critical amount of Basic Themes of inclusive circulation and elite brain mobility in Iran

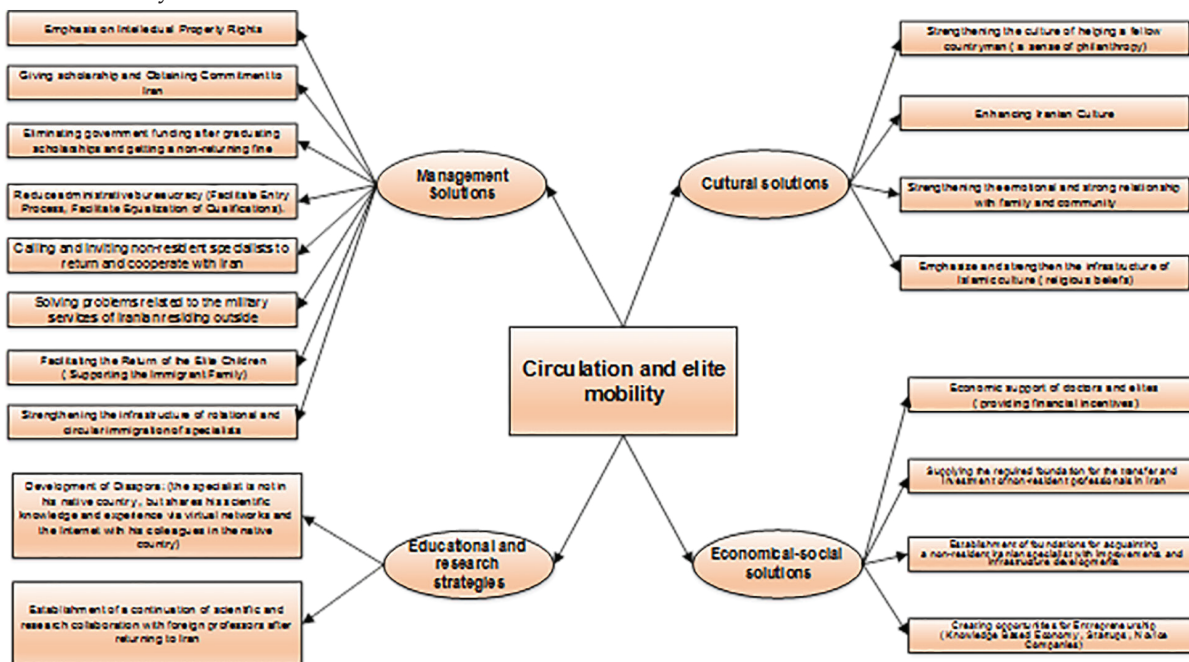


Figure 2: Circulation and brain mobility of elite medical physicians in Iran

completion of the course. People's beliefs and faith have an important role in choosing where to live and study. Countries like China, India, Malaysia and Singapore care about beliefs, cultures and families, and know them as the reasons for their return. The results of this study align with past research (22, 30-32). Family status and the desire to immigrate have an important role in deciding whether to return or stay. In the qualitative section one of the interviewees stated: "last night a martyr was brought to the country after thirty years, the mother lulls her child, we owe him." Another interviewee maintained: "I love the Iranian-Islamic culture. Now it's my turn to improve my country's condition, I passed my job position (head of the hospital), and we need to mobilize to improve our conditions. "

Making necessary foundations for the transfer and investment of non-residential specialists with factor load (0.76), the theme of economic and social strategies was placed in the second priority. The transfer of capital and assets of (knowledge, experience and physical capital) is a positive result of inverse immigration. Now, if we want to withstand the sanctions, a great effort should be put by Iran. Therefore, it is a strategic opportunity, and the government must allocate a number of privileges and exemptions for economic investment and elite civic engagement. Most non-resident professionals like to remain in contact with their motherland. The results of this study were consistent with (7, 8, 13, 23).

The next suggestion for returning non-resident graduates was to provide a framework for continuing scientific and research collaboration with foreign professors after returning to Iran with a factor of 0.70, representing the content of organizing educational and research strategies. Educational and research interactions with professors can lead to the individual and scientific development of the country. Some interviewees state that "one of the policies of developed countries is the recruitment of elites, regardless of their nationality and religion. They are developed so for other countries' elites, so called "the red carpets"

have been spread. With the great propaganda, the elite are attracted easily, so we have the right to invite our elites as well as academic professors (regardless of nationality and religion). Some interviewees referred to the plans for exchange of professors and students, especially from neighboring and Muslim countries. The interviewees also suggested that "there are some common problems that can be solved with the help of non-resident friends and foreign academics, and some parts of the research can be done, because of sanctions and lack of research facilities, by interacting with them through the Internet and cyberspace." A number of interviewees referred to the collaboration of virtual colleges and e-learning centers of universities that could provide this scientific platform." Diaspora is one of the processes involved in helping to develop and recovering brain drain. In this way, the non-residence specialist tries to communicate with scientists and domestic entrepreneurs through instant communication, providing a good opportunity for business, transferring knowledge to the motherland, and compensating for the underdeveloped knowledge and providing the basis for scientific participation and the transfer of knowledge and technology. Therefore, the goal of Diaspora networks is to create and strengthen communications and exchanges between scientists and researchers with their counterparts in the mother country, where the improvement and development of educational, social, cultural and professional programs is their priority. The Internet plays an important role in this regard (16-20, 33).

Diaspora can be used for a country's sustainable economic and social development by combining individuals' abilities and their national identity, and with the help of virtual networks and advanced telecommunication systems. These skilled migrants are able to carry out complex projects that do not require strict coordination and management, but require intellectual participation.

Two examples of Diaspora's networks are "Red Caldas networks" in Colombia and "the Iranian Scientific Information Network" in

Iran. Diaspora networks can be considered as an excellent advantage in sharing knowledge and experiences with the common language and culture and familiarity with national and local conditions (13, 27). One must pay attention to the fact that ideas can move without the elites' moving. Non-resident professionals have a particular dependency on the motherland, as a result, educational networks can be used as bridges, and by interaction good quality can be achieved. By creating a strong bilateral and multilateral commitment, scattered specialists around the globe can be brought together and achieve the best results despite the international brain drain (34).

Public investment and private sector co-operation for research and innovation are essential. The credibility of universities with prestigious backgrounds and scientific fame can help attract the best scientists from all over the world. Although economic prosperity is a driving force, the educational environment and international ranking of universities play an outstanding role in attracting young scientists (23, 35).

Simultaneous training and co-operation (periodic study abroad and employment in the country) is a useful step and a good solution to this. Although studying abroad is generally beneficial for the elite, if they know that they have a good job and a supporting family and cultural roots in their motherland, they have a greater incentive to return to their homeland. [The findings are consistent with previous research for the scientific and research collaboration of domestic specialists and non-resident professionals (27, 36).

Reducing administrative bureaucracy (facilitating the entry process - facilitating the equalization of qualifications) and strengthening the rotational and circular immigration infrastructure of professionals with factor load of 0.66 represents the theme of organizing management solutions. Preventing elite immigration is neither feasible nor ethical, but we hope that by creating the appropriate infrastructure in all aspects of the society, be the cause and reason of the reverse

immigration and brain mobility. Interviewees "have been complaining about the document equalization Process and reviewing the resume and the proper naming of the new and modern academic majors, the difficult entry process and frustrating bureaucracy, and also staff behavior in organizations." They said that no place in the world would be like the motherland, but sometimes the rules and regulations are troubling. If infrastructure is improved and developed, social security and economic stability are provided, a dual citizenship (two citizenship) is granted for their wives and children, the incentive to return will be strong. The findings in this study are consistent with previous research findings (5, 13, 23).

Researchers and Experts believe that elite immigration Follows the double-sided international strategy of brain drain, as well as strategic planning for returning and hiring the elite, recommend the following six practical solutions:

Return of immigrants to their country of origin - Restriction of international mobility - Recruitment of international immigrants - Reparation for loss of human capital (Tax) - Resourcing expatriates (Diaspora option) - Retention through educational sector policies (13).

To conclude: The freedom of individuals to immigrate and mobility between countries cannot be limited, because the mobility of specialists is beneficial for the sending and receiving countries and for the specialists themselves. This can be controlled and managed through immigration management policies. In the case of proper management of skilled immigrants, the models applied by successful countries in returning their skilled human resources, and the positive feedback can be used. Therefore, it is recommended to identify contents, in particular, to strengthen and emphasize the Islamic culture, to establish the necessary conditions for the transfer and investment of non-resident specialists, to establish a framework for scientific and research cooperation with foreign professors, to set up entrepreneurial projects, knowledge-

based economics, supporting startups, downsizing The administrative bureaucracy will be more targeted by planners and policymakers. Meeting the personal and organizational needs of individuals can have an impact on the restoration and circulation of the brains and will be supported through improvement and implementation of the temporary and correct policies regarding human capital.

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Strength and Limitation

One of the strengths of qualitative studies is that it opens new avenues for researcher and the researcher is aware of the opinions of the participants.

One of the problems of the qualitative studies, is the difficulty of coordinating the interviews, and the interviewees do not share their opinions because of some personal and professional reasons. Gaining their trust is a difficult task. A number of interviewees did not allow their speech to be recorded.

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Ethical approval: Before the beginning of the study, the plan was reviewed and approved by the Medical Ethics Committee of the Islamic Azad University of Isfahan (Khorasgan) IR.IAU.KHUISF.REC.1397.194. At the same time as the interview was conducted, the research objectives, the characteristics of the research team, the method of data dissemination and the nature of the informing participants, and about confidentiality and privacy were assured.

Practical suggestions and solutions

1- Eliminating the anxiety and distress of the elite to find a suitable job, supporting the transfer of savings and personal belongings

2. The positive reaction of society and organization to the return, acceptance and use of valuable experiences and facilitate

the process of entering and confirming their documents.

3- Maintaining individual and work autonomy and protecting individuals and families in order to adapt to new conditions.

Conflict of Interests

The authors declare that they have no conflict of interests.

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