İSTANBUL UNIVERSITY PRESS

Journal of Economy Culture and Society
JECS 2023; 68 : 97–110
DOI: 10.26650/JECS2023-1229036

Research Article

Reasons Behind the Migration of Highly Qualified Employees from Turkiye: The Case of Software Developers and Engineers

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ABSTRACT

The emigration of highly skilled software developers and engineers from Turkey has gained momentum, leading to a shortage of technical staff in technology companies, particularly startups. In order to understand their motivations for migrating, interviews were conducted with software developers and engineers. The findings reveal that highly skilled individuals perceive their labor as undervalued in Turkey, both economically and in terms of social status. The international nature of the software industry makes it relatively easy for them to migrate to other countries or work for foreign companies remotely. They express that companies in their destination countries respect their work, private lives, and individuality. To address this issue, Turkish companies can consider measures such as assisting key employees in purchasing houses and cars, as well as supporting their families' education and healthcare expenses, to ensure long-term loyalty. Furthermore, it is suggested that salaries for software developers should be adjusted to be more comparable to those abroad in terms of purchasing power. Failure to provide sufficient incentives may result in software exports falling short of expectations amidst this wave of migration.

Keywords: Brain Drain, Highly Skilled, Software Developers, Income, Respect

Submitted : 03.01.2023
Revision Requested : 16.07.2023
Last Revision Received : 19.07.2023
Accepted : 23.09.2023
Published Online : 07.12.2023

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Introduction

The wealth of nations is determined by the importance they assign to education rather than the resources they possess. A trained workforce, particularly in strategic sectors, has emerged as the driving force behind economic growth. In the current era, information processing and software technology are particularly crucial areas of focus. However, employees in fields like engineering, particularly software, who feel neglected, often seek migration as a solution. Qualified individuals in Turkey, whose economic prospects, social lives, and aspirations have reached a dead end, embark on migration journeys, leaving behind their settled lives, close relatives, and friends (Akın, 2022: 1022). Making the decision to migrate and subsequently following through with it is an arduous task that can significantly alter the lives of individuals and those around them. Through interviews, the study ascertained the reasons and expectations of software developers and engineers who have migrated have. Based on the findings, we put forward suggestions for public and corporate policies aimed at strengthening their loyalty. It is imperative to address the concerns of these professionals and create an environment that acknowledges their worth, supports their economic well-being, and fosters a sense of belonging. By implementing targeted policies, both at the organizational and national levels, efforts can be made to retain highly skilled individuals, mitigate the brain drain, and maximize the potential contributions of software developers and engineers to the country's development.

The global software market is projected to reach a size of USD 593.40 billion in 2022, with the largest segment being enterprise software valued at USD 237.10 billion. It is anticipated that the revenue will continue to grow at a rate of 6.50% annually, reaching a market volume of USD 812.90 billion by 2027 (Statista, 2022). Moreover, the impact of the sector on the digital market is substantial, estimated at 2 trillion dollars. However, not all countries can equally benefit from this transformative industry, as highlighted in a report by Deloitte and Tüsiad in 2021. Developed countries, on average, witness a 2% contribution of the software industry to their exports, while in developing countries like Turkey, this figure stands at 0.5%. To illustrate, Turkey's software exports amount to 800 million dollars, whereas Germany's exports reach an impressive 36 billion dollars. Among developing nations, Ukraine achieved software exports of 5 billion dollars in 2019, while Poland exported 15.5 billion dollars with the support of 300 thousand software developers (Deloitte & Tüsiad, 2021).

In the same report by Deloitte and Tusiad (2021), various projections were made for Turkey's software industry. The report suggests that the industry has the potential to grow three to four times by 2025. It is anticipated that this growth could lead to 10 billion dollars in software exports, the creation of 100,000 new jobs, and the emergence of 10 unicorns (startups valued at over $1 billion).

The report was compiled with the involvement of a large team and took into account insights from 70 industry experts, as well as statistical information. The projected growth potential is based on four key assumptions regarding Turkey's progress in the software industry:

- a) Competitive Cost of Living: Turkey has a lower cost of living compared to both developed and developing countries, with the cost of living estimated at USD 772. This competitive advantage enhances the attractiveness of Turkey as a location for software development.
- b) Geographical and Cultural Proximity: Turkey's strategic location provides it with close proximity to 64 countries and approximately 1 billion people. This geographical advantage, coupled with cultural similarities, creates potential business opportunities and facilitates collaboration with neighboring markets.
- c) Medium-Developed Information Technology Market: The report indicates that there is an increasing focus on investment in software companies within the broader technology sector in Turkey. This emphasis on software development presents growth opportunities for the industry.
- d) Medium-Developed Startup Ecosystem: Turkey boasts an active and expanding entrepreneurial ecosystem, supported by technopolises, incubators, and venture programs. This ecosystem fosters innovation, collaboration, and the emergence of startups, creating a favorable environment for the growth of the software industry.

This report heavily relies on statistical data and expert opinions, lacking a human-centered research methodology. It fails to address the perspective of the software developers, who are central to the field. It is important to recognize that the software industry thrives on human capital rather than physical capital. According to the Software Industrialists Association (YASAD), approximately 30,000 software developers emigrated from Turkey in 2021 (Meridyen Haber, 2022). Given the significant outflow of software developers, it raises questions about how the country can approach the projected 10 billion dollars in software exports. Another example that highlights the importance of considering user experience is the report on Erzincan Ergan Mountain, commissioned by Ernst & Young, a reputable consulting firm (Northeast Development Agency, 2012). Akın and Demir (2021) argue that the report failed to accurately assess the potential of Erzincan Ergan Mountain as a significant ski resort from the perspective of customers. Despite

highlighting the geographical characteristics, the report overlooked the past experiences and needs of customers in mountain tourism and skiing. Both the infrastructure and the facilities at the Ergan mountain center fell short of meeting customer expectations. Reports prepared by large business management companies often prioritize numerical data while neglecting valuable insights from stakeholders on the ground. It is essential to consider the perspectives of those directly involved to gain a comprehensive understanding of the situation, rather than relying solely on statistical analysis or expert opinions. Taking a more holistic approach that incorporates the experiences and feedback of stakeholders can provide a more accurate and nuanced understanding of the subject matter.

The impact of migration from source countries to developed nations has been extensively debated (Davenport, 2004, 618). Economic expectations have been recognized as a significant driver of migration (UN, 2017). However, there has been limited discussion in the literature regarding the migration of qualified professionals, particularly software developers. Furthermore, the unique ability of software developers to work for foreign companies without leaving their home country has not been adequately emphasized. Migration has played a crucial role in Turkey's recent history since the 1960s, primarily driven by domestic migration from rural areas to urban centers in response to industrialization. Internationally, migration began with Germany's demand for workers and subsequently expanded to Western Europe and North America. Bilateral agreements between states facilitated foreign migration movements, starting with agreements signed with Germany in 1961, followed by the Netherlands, Belgium, Austria, France, Sweden, and Australia (Deniz, 2014: 186). However, these migration movements were primarily focused on unskilled or less qualified workers and were governed by legal frameworks. With advancements in the communication sector, the process of connecting individuals and companies has become faster and more efficient. Software developers and engineers have greatly benefited from this development due to their technological expertise. However, the migration of these skilled professionals poses a threat to the progress of crucial sectors such as software, information technologies, and defense industries. To ensure the continued development of these sectors, it is essential for both the country and companies in Turkey to adopt economic policies that promote voluntary retention of these highly skilled employees.

By joining the European Customs Union, Turkey made progress from lower and lower-middle technology to upper-middle technology, but it failed to advance to high technology. In fact, the share of high-technology exports as a proportion of total exports has slightly decreased (Sak, 2007: 34). The only way to reverse this trend is by creating opportunities for software developers and engineers, who are at the forefront of technological innovation, to engage in high value-added activities.

This paper contributes to the existing policies on brain drain in several significant ways. Firstly, it focuses specifically on the migration of highly skilled individuals, with a particular emphasis on software developers and engineers who play a crucial role in the economy. Previous studies have generally examined skilled migration in a broader sense, but this research narrows its scope to highlight the importance of these professionals as productivity drivers, particularly within startup companies. Secondly, the paper utilizes qualitative research methods, employing high-quality interviews conducted by professional journalists on social media platforms. This approach provides a valuable and rich source of data for analysis. Thirdly, the study sheds light on the differences in opportunities between Turkey as a developing country and developed Western countries from an organizational studies perspective. It proposes macro-level policies that the public sector can implement, as well as micro-level policies that businesses can adopt to address the challenges related to skilled migration. Lastly, to ensure the accuracy of the interviews conducted on social media, the draft article was shared with industry experts who were asked to provide their interpretations based on their extensive experience. This validation process not only confirmed the accuracy of the findings but also generated additional insights. In summary, this research highlights the need to create favorable conditions for software developers and engineers to participate in high value-added activities. It provides valuable insights into the migration of highly skilled individuals and proposes policy recommendations at both the macro and micro levels. By addressing the challenges of brain drain and retaining these skilled professionals, Turkey can make significant strides in its technological advancement and economic growth.

Literature

Migration can be driven by various factors, including economic, family, political, and professional reasons. Economic motivations, such as the desire to improve one's well-being through higher earnings, are a primary driver of migration (Aksoy, 2012:294). Education, occupation, demographic characteristics, and income opportunities all play a role in shaping migration decisions, as they can increase the potential benefits of migration (Mazzolari, 2009; Pivnenko & DeVoretz, 2004). Individuals who are better educated or continue their education in the destination country often have access to higher income opportunities. Political, social, and cultural inequalities in the region where individuals reside,

stemming from differences in ideas and ethnicity, can also contribute to migration (Aksoy, 2012:294). People may migrate to new regions seeking economic gains, educational opportunities, personal security, religious freedom, political freedom, and social freedom (Alkın, 2019). According to Weng and Hu (2009), career development encompasses four key factors: advancement of career goals, development of professional skills, rapid promotion, and wage increases. These factors influence individuals' decisions regarding career and professional growth, which can in turn influence migration decisions. Furthermore, the organizational structures of institutions in the source country can play a role in migration decision-making. Factors such as limited career opportunities, imbalanced workloads, and weak incentives within the organizational setup can contribute to individuals seeking better opportunities elsewhere (Rosenblatt & Sheaffer, 2001; Wanniarachchi et al., 2022: 1491).

Push and pull factors are influential in the decision-making process of migration, and their significance can vary depending on the country and industry involved. For software developers migrating from underdeveloped or developing countries to developed nations, a combination of push and pull factors comes into play. Push factors represent the reasons that compel individuals to leave their home country. In the case of underdeveloped countries like Turkey, these push factors include limited career prospects, low income levels, unfavorable working conditions, a lack of recognition for their labor, and political and social instability. These factors generate discontent and motivate individuals to seek better opportunities abroad. Pull factors, however, are the attractions and opportunities presented by the destination country. In this case, developed countries offer enticing pull factors such as higher career prospects, better income potential, improved working conditions, greater respect for labor, and more stable political and social environments. These factors create a sense of hope and opportunity, encouraging software developers to consider migrating to these countries. The combination of push and pull factors leads software developers to consider migration as a means to enhance their professional and personal circumstances. By understanding these factors and addressing the underlying issues, policies can be developed to mitigate brain drain, retain highly skilled individuals, and promote the development of the software industry within their home country.

Highly qualified manpower tends to be less productive in a stressful work environment. Workload, which refers to the disparity between an individual's available resources and the demands of a task, plays a crucial role in determining the level of stress experienced by employees (Bowers and Jentsch, 2005). Hart and Staveland (1988) outline six dimensions of workload, including mental and physical demands, temporary pressures, frustration, effort, and performance. Insufficient or excessive workload can both contribute to job stress (Katz and Khan, 1978). High work intensity can lead to mental stress among employees (Shah et al., 2011), while insufficient workload can result in job alienation, characterized by feelings of isolation, powerlessness, and a lack of meaning in one's work (Blauner, 1964). This contrasts with the positive state of work engagement (Tonks & Nelson, 2008). Underutilization of skills or the inability of employees to reach their full potential can also lead to occupational stress.

Regarding migration factors, expectations in the destination country have been identified as triggers for migration (Hoppe and Fujishiro, 2015). Pull factors represent the attractions and opportunities offered by the destination country. In developed countries, such as Germany or Canada mentioned in the findings, pull factors include improved job prospects, higher salaries, better working conditions, greater respect for labor, and a more stable political and social environment. These factors entice software developers to migrate in pursuit of enhanced career prospects and a higher quality of life.

However, it should be noted that qualified migrants often encounter challenges in finding stable employment in the country where they settle, as highlighted by Qureshi et al. (2013) and Crowley-Henry et al. (2018). In Sri Lanka, for instance, skilled migrants tend to migrate due to limited career opportunities in their home country (Wickramasinghe and Jayaweera, 2010). The interplay of push and pull factors can vary across countries and sectors. When an underdeveloped or developing country intersects with a developed country, both push factors (e.g., limited opportunities in the home country) and pull factors (e.g., abundant resources in the destination country) coexist. In the case of software developers migrating from Turkey, the combination of push factors stemming from limited opportunities and pull factors offered by countries with more favorable conditions contributes to their decision to seek better prospects abroad.

Migration can be categorized into internal and external migration. Internal migration refers to the movement of people within a region or country, while external migration involves crossing national borders. Regular migration occurs within the legal framework, whereas irregular migration is considered illegal. Chain migration, where migrants follow relatives who have already migrated, is a common form of migration that carries fewer risks for the migrant, as they receive support in settling and finding employment from their relatives (Çağlar, 2018: 37).

Migration partially addresses the challenges faced by both the migrants and the host societies. For instance, in terms of the economy, migration helps to alleviate the shortage of qualified employees in the host society, reducing production costs and even preventing production disruptions. While the migrant may have been unemployed in the source country,

they can improve their social status in the destination country (Tekin, 2011). However, the negative effects of migration on balanced development are exacerbated. It leads to the concentration of qualified individuals in certain regions, resulting in the decline of the regions they migrate from. It is argued that a more balanced distribution of investments throughout the country can help slow down migration movements (Genç et al., 2019: 494).

Developed countries, by accepting qualified migrants, benefit from the cost savings in education, as they do not bear the expenses of educating these migrants (Bekirtaş and Kandemir, 2010; Lowell and Findlay, 2001; Erdoğan, 2003; De Haas, 2006: 15-16). It has been argued that the funds saved from education costs can be redirected towards research and development (Erkal, 2011). However, Wong and Yip (1999) argue that immigration should be limited due to the potential loss for the sending country. They particularly emphasize that a decrease in the number of qualified individuals may lead to higher wages for the remaining qualified individuals and contribute to imbalanced development (Wong & Yip, 1999: 701-725). Additionally, source countries may lag behind technologically (Di Maria & Stryszowski, 2009: 307). However, Grubel and Scott (1966: 271-274) argue that losses are mitigated as migrating skilled workers are replaced by new ones. Tezcan (1996) emphasizes that highly qualified labor, such as scientists and engineers, should not be subject to national restrictions.

A critical question arises regarding whether these migrant individuals bring back the experiences and knowledge they have gained to their home countries. Migration entails both external benefits for the receiving country and potential knowledge gains for the sending country. Brain drain, however, refers to the receiving country benefiting without incurring any costs. The failure of highly qualified employees to transfer their knowledge to the source country creates a one-sided win-lose situation between the countries (Bakırtaş & Kandemir, 2010). Nevertheless, if outgoing migrants contribute to improved international trade and services between the two countries, the source country can also benefit from their migration (Easterly & Nyarko, 2008).

While developed countries used to accept employees from various backgrounds in the past, they have gradually shifted towards attracting qualified and skilled individuals, particularly in selected fields. İlhan (2020) argues that developed countries target younger students who aspire to improve their economic and social status. He further highlights that the results of international exams in mathematics and science, such as PISA and TIMMS, influence the selection of target countries (İlhan, 2020). Specifically, scientists who have achieved international success are often prioritized as targets for immigration (Halıcı, 2005: 259).

The decision of individuals to settle permanently in the destination country instead of a temporary stay gives rise to tensions and the search for solutions. The tension stems from the nation-state structure, where those seeking permanent inclusion aim to become part of the nation and obtain citizenship rights. However, there are opposing forces that resist assimilation within the nation-state and hinder this integration. To address this, concepts such as transnational citizenship and the democratization of borders are advocated (Tekin, 2011). Overcoming the crises within the nation-state understanding can be pursued through three approaches: national integration based on equal citizenship, assimilation within the dominant society, and the development of multiculturalism to recognize the rights of cultural diversity (Brown, 2000; Aksoy, 2012).

Qualified migration from Turkey is not a new phenomenon. Concerns about this issue have been raised in early academic articles (Atılgan, 1986). The third five-year development plan of the State Planning Organization (SPO) from 1973 to 1978 highlighted that an average of 375 thousand Turkish scientists and highly qualified personnel emigrate to developed countries annually. More than half of these migrants are in the medical field, 40% in engineering, 5% in natural sciences, and a small number in social sciences. It has been estimated that approximately 10% of Turkey's qualified workforce resides abroad (Erkal, 1992). According to a study by Oğuzkan (1971), 81.3% of Turks working in the USA graduated from a foreign educational institution, with 46.7% obtaining their latest degree from the USA. These data demonstrate that the brain drain problem in Turkey, similar to many other countries, is experienced primarily by individuals who study abroad. It has also been predicted that migration mobility will increase with the advancement of communication channels (Erdoğan, 2003: 98). Consequently, the mismatch between education planning and the employability of the qualified workforce in certain sectors has been identified as a significant issue (Erdoğan, 2003: 98).

As an intriguing historical fact, the measures suggested in the 1970s in the SPO report included employment policies, wage policies, research environments, and working conditions (SPO, 1973-1978). Furthermore, Erdoğan (2003: 95) argues that in order to prevent migration due to political and religious reasons, freedoms should be granted to the qualified labor force. Specifically, it was proposed that countries like the USA and Canada should adopt incentives and facilitation policies to attract educated and trained human resources (Erdoğan, 2003: 95).

Method

Design

In the literature, qualitative content analysis is widely recognized as a systematic approach for analyzing qualitative data. The approach involves identifying patterns, themes, and concepts within the data to generate meaningful insights and understanding (Lindgren et al., 2020). Content analysis is utilized to condense and abstract a sizable amount of textual data and directly extract participant messages (Gupta et al., 2018), without imposing a researcher's viewpoint, in order to gain fresh insights into the study phenomena.

The study's central question is: "What are the primary motivations and factors that drive software developers in Turkey to migrate abroad, and what are the implications for their working conditions, career prospects, and perceptions of their home country?"

Through interviews, people's thoughts, feelings and behaviors are documented (Agafonoff, 2006). Qualitative research was planned from interviews conducted on social media to gather insights into the decision-making processes of software developers and engineers in migration abroad. Socio-economic and demographic characteristics are not prioritized in the interviews (Kumar, 2012). The most important criterion for participant selection is that qualified employees have some experience with migration.

The aim of the interviews is to uncover concepts (trends, patterns). Although usually, 10-15 participants elicit concepts (Faulkner, 2003), the abundance of migration story videos available on social media was utilized to reinforce understanding of decision-making processes. In a qualitative study, Hennink and Kaiser (2022) statistically proved that the saturation point is reached when between nine and sixteen participants have the same (homogeneous) topic. In this study, 24 software developers and engineers (same status) from Turkey (same country) were interviewed about their experiences of migration abroad (same topic). According to Hennink and Kaiser (2022), the number of participants should be increased as heterogeneous elements emerge (for example, in a study comparing Indian and Turkish engineers).

Setting and Participants

Twenty-four videos telling the migration stories of engineers and software developers who migrated abroad were watched. Those with Y code were identified as software developers and those with M code as engineers. Thanks to the opportunities provided by social media, the experiences of real people were listened to first-hand in terms of decision-making processes (Salda, 2020; Güler & Başer, 2020; Önder, 2017). All migrants migrated to either North America or Western Europe due to job opportunities and future expectations. There are also those who work for companies in these geographies without physically migrating. The most important advantage of videotaping is that it makes it easy to watch the same person's words and behaviors repeatedly, to take notes and to understand them in depth.

The speakers were coded as SD1, SD2,..(referring software developer) and E1, E2 (engineers) (table 1).

Table 1. Participants

#	Age	Marital status	Gender
SD1	21	Single	Female
SD2	29	Married	Male
SD3	32	Single	Male
SD4	25	Married	Female
SD5	35	Married	Male
SD6	41	Divorced	Male
SD7	48	Married	Female
SD8	23	Married	Male
SD9	34	Single	Male
SD10	45	Married	Male
SD11	52	Divorced	Male
SD12	27	Single	Female
SD13	19	Married	Male
SD14	25	Single	Male
SD15	27	Single	Female
SD16	25	Married	Male
SD17	28	Single	Male
SD18	29	Single	Male
E1	34	Married	Male
E2	23	Single	Male
E3	37	Married	Male
E4	36	Single	Male
E5	43	Married	Male
E6	22	Single	Male
E7	23	Married	Male
Ê8	21	Single	Male

Findings

Table 2 presents the main categories of motivation for migration, classified into push factors and pull factors: Working conditions, perception of Turkey's future as push factors and expectations in foreign countries, and opportunities and experiences abroad as pull factors.

Table 2. Push and Pull Conditions

Push factor-Working Conditions	Working conditions in Turkey are described as exhausting both physically and emotionally. Software developers feel that their efforts are not adequately rewarded in terms of salary and reputation. Long working hours and a lack of work-life balance are common issues.
Push factor- Perception of Turkey's Future	They have a pessimistic outlook on Turkey's political, economic, legal, educational, and social progress. The perception of a lack of trust, justice, and protection of social rights in Turkey reinforces their decision to seek better opportunities abroad. They hope for a country that values diversity of opinions and voices.
Pull factor- Expectations in Foreign Countries	When software developers go abroad, they expect companies to respect their labor, value their private life, and acknowledge their personalities. They want to move away from hierarchical structures and foster courtesy, respect, and empathy between managers and developers.
Pull factor- Opportunities and Experiences Abroad	Software developers see migrating as an opportunity to gain work experience, learn new technologies, and work on innovative projects. They value the chance to collaborate with high-quality teams and professionals in their field.

Push Factors

Working Conditions in Turkey

Software developers claim that their labor is not respected, expressing dissatisfaction with working conditions and income. Economic motivation is considered the primary reason for migration (Aksoy, 2012:294; Mazzolari, 2009; Pivnenko and DeVoretz, 2004). However, in Turkey, economic factors and working conditions are intertwined. Software developers feel that they do not reap the benefits of their labor, not only in terms of monetary compensation but also in terms of broader aspects such as reputation and working conditions. They describe their experiences as being characterized by fatigue, emotional exhaustion, and a lack of empathy in subordinate-superior relationships.

Working conditions in Turkey were exhausting for me. E2
Working conditions in Turkey wear people down both physically and emotionally. E2
In Turkey, I do not see a return for my contribution in terms of salary and reputation. SE4
Some software developers leave due to financial difficulties. SE12
Promotions with success are very difficult to achieve in Turkey. E1
There is too much Nepotism in Turkey. SE1
Many of my friends resigned due to the fact that people who did not know the job were managers in the companies they worked for. E3
I know that working hard or doing your job well does not bring success in Turkey. SD15

Other professional fields face similar challenges. However, software development, being an international language, offers relatively easy opportunities to migrate to another country or work for a foreign company without physically relocating. Those who have prior experience living abroad have an advantage, as their experiences are valued. The availability of communication tools facilitates intense information sharing among software developers.

When I was living in Turkey, I was thinking about going abroad. When my friends went, I did too. SE10
Those who are planning to go abroad compare their lives with the people around them who have been abroad and decide accordingly. SE15
The engineers who went abroad before us became targets for us. E5

The family situation represents the main impediment for software developers in Turkey who wish to migrate abroad.

This obstacle arises when a software developer's spouse or partner has a stable job or established career in Turkey, making it challenging for them to relocate as a family. Factors such as the spouse or partner's career prospects, existing commitments, or personal ties to their home country can pose significant barriers to migration. Families with school-age children may also be hesitant to disrupt their education and social stability by moving to a foreign country. Therefore, the family situation plays a crucial role in determining the feasibility of migration for software developers in Turkey.

Very few of my friends working in the same sector stayed in Turkey, and they stayed for family reasons. SE16

Perception of Turkey's Future

They have a vision for their future and that of their family. They believe that moving to a more developed and civilized country would provide their children with a better education and opportunities. They see migration as a way to break free from the cycle of challenges in Turkey, including political, economic, legal, educational, and social issues. They lack trust in the country and hold a pessimistic view of its future. The rankings provided by international organizations further support their concerns. In the World Justice Project's rule of law ranking, Turkey was placed 116th out of 140 countries in 2022. In the democracy ranking by the University of Würzburg in 2020, Turkey ranked 137th out of 176 countries and was categorized as a moderate autocracy. While these rankings indicate a decline in terms of law and democracy, it is important to note that the perception of the individual plays a crucial role in qualitative research. The highly qualified labor force that Turkey requires is dissatisfied with the country's current trajectory.

The political turmoil in Turkey makes one pessimistic about the future. SD13
I am hopeless about the future in areas such as economy, justice, and education in Turkey. SD13
The situation in the country was influential in my reason for going abroad. SD14
I don't think Turkey will be in a better situation than this in the medium term. SD16
People in Turkey should pay more attention to education and ask the question why more. SD17
I do not think there is an environment of trust in Turkey. SD14
I do not think that our social rights are protected in Turkey. SD14
I don't think there is justice in the country. SD14
I think that with the development of the economy in Turkey, issues such as education, culture, and respect for oneself and one's environment will improve. SD18
I want a place where there are many opinions and different voices rather than a place where everyone thinks the same and has the same ideas. SD15

Pull Factors

Expectations in Foreign Countries

When they work in other countries, they expect companies to value and respect their work, personal life, and individuality. They desire to distance themselves from organizational structures that neglect the importance of personal life and work-life balance. Particularly in Turkey, there is a need to restructure the hierarchical relationship between superiors and subordinates. It is evident that these highly qualified individuals should be regarded as owners of their own work (like company owners) and move away from the traditional division between managers and employees. Concepts such as courtesy, respect, and empathy should be fostered between company managers and software developers.

I think I am taken for granted. I am not disturbed by incompetent managers at odd hours. SD2
I both work less and earn well from my work abroad. SD3
In foreign countries, managers do not call easily after working hours. SD10
I know that in Turkey I work from 8 a.m. to 3 a.m. E2
I could not spare time for my family because of the working hours in Turkey. E2
In abroad, you have peace of mind outside of working hours. E3
My manager told me to be unreachable when I was going on leave at my job abroad. SD11
They do not call and disturb me in my social life abroad. E4

They are able to live on their salary and have also been able to buy a house and a car. In particular, a car (high model) and a house (in the form of a villa) are perceived as status indicators. Being able to live comfortably on their salary indicates that they have sufficient income to meet their needs and potentially enjoy a higher standard of living compared to their experiences in Turkey. In many societies, owning a house and a car, especially one that is considered prestigious or upscale, is often associated with financial success and social status.

My friend bought a good quality second-hand car with his salary in Germany. I have to work for many years. Even another friend of mine bought his house in Canada. I think I am wasting my time in Turkey. E11

Opportunities and Experiences Abroad

They perceive working abroad as part of their work experience and see it as an opportunity to learn new technologies. They value the chance to work on interesting projects and collaborate with quality teams and software developers. Travelling abroad not only enhances their technical skills but also broadens their horizons and allows them to gain valuable insights and experiences. It provides them with the opportunity to challenge themselves, adapt to different work cultures, and further develop their professional capabilities.

I want to gain experience by working with new technologies abroad. SD14
The positive side of living abroad is that you have the opportunity to work on projects that have never been done before. E7
You work with the best people in your field abroad. E7
When students abroad graduate, they graduate as an employee with practical experience. E8
Your colleagues are very important; you have the opportunity to work with a very good working group abroad. E10

Expert Opinion

To validate the reliability of the article's findings, the draft of the article was shared with a software company owner, a startup company partner, and a corporate venture capital firm manager for their input. Their opinions were sought without conducting formal interviews. Additionally, an insurance company manager was requested to illustrate the provision of home support in their company. These steps were taken to gather insights and perspectives from industry professionals and to ensure the robustness of the article's content.

Software company owner:

As an entrepreneur managing a software team, I concur with the findings of the article. In order to manage costs effectively, I adopt a strategy of hiring junior programmers at lower salaries and invest in teaching them the necessary skills. This approach creates a win-win situation where I provide support to the individual until they become proficient in software development, and in return, they contribute to the company's productivity. However, after a certain period of time, typically around 1.5 years, some of these employees choose to leave the company seeking higher earning opportunities. Many of them either migrate or work remotely as support staff for foreign software companies. This trend highlights the impact of migration and remote work options in the software industry.

Startup company owner:

I agree with the findings of the article. Finding highly skilled software developers can be challenging, and economic factors play a significant role in their migration decisions. Additionally, the lack of political freedom in Turkey has a greater impact on these individuals. However, the most crucial factor is the economic disparity. While a salary of $4,000 may be considered high in Turkey, it may be relatively affordable for software developers in Europe and America. The significant wage gap makes it difficult to retain these qualified employees within the country. Even those who initially stayed during economic crises eventually leave, as mentioned in the article, or they opt to work abroad.

Venture capital investor:

Finding software developers in startups in Turkey has indeed become a significant challenge. However, it is not only software developers but all employees who need to be respected and valued in order to foster a positive work environment. Regarding the housing and car aspect, it can be seen as a matter of providing suitable accommodations and transportation for employees. Owning a house and a car can be considered status indicators and can contribute to employee satisfaction and loyalty.

Supporting employees in purchasing a house and a car may have implications for the company's balance sheet in terms of costs. It would depend on the specific arrangements made by the company, such as whether the support is provided as a loan, subsidy, or other financial arrangement. Companies would need to carefully consider the financial impact and potential benefits of such support.

Another effective way to retain technical staff is by offering stock options. This aligns the interests of the employees with the success of the company. If the company performs well, employees with stock options can share in the financial gains, providing them with a sense of ownership and motivation to contribute to the company's growth and success.

Insurance company executive:

The owner of the insurance company I work for has implemented a unique approach to support its managers in buying a house. Although it is not a formal corporate benefit, the process is as follows: the company owner takes a 10-year

mortgage loan and deducts the monthly mortgage installments from the manager's salary during this period. At the end of the 10-year period, the title deed of the house is transferred to the manager.

This arrangement not only provides assistance to key personnel in buying a house but also creates a strong bond between them and the company during the repayment period. It serves as an incentive for managers to remain committed to the company and ensures their long-term loyalty.

Conclusion

While this article discusses the migration of software developers, one of Turkey's most important sources of qualified labor, the underlying aim is to show that the effects of this critical migration are not only increased prosperity for individuals, but that migration also poses a serious risk to Turkey's transformation into a high-tech country. The migration process has gained momentum, and now when a Turkish software developer migrates, they often invite their teammates or inform them about opportunities.

In the 1960s, migration from Turkey to Western Europe mainly involved unskilled and low-skilled labor through intergovernmental agreements. However, starting from the 1970s, migration patterns shifted as students going abroad to study and employees working in international firms constituted a qualified labor migration. This trend is not unique to Turkey but has been observed in other developing countries as well.

As software developers, they have expressed that their labor is not adequately respected, both in material and moral terms, in Turkey. Despite their contributions to their company in terms of salary and reputation, they feel that their efforts are not reciprocated. Economically, they aspire to be able to afford a house and a car without financial worries. It is worth noting that professionals in other fields face similar challenges. However, due to the universal nature of software as an international language, it is comparatively easier for software developers to migrate to another country or work for foreign companies remotely without physically relocating. They are motivated to advance in their careers and seek out opportunities to work on interesting projects.

When migrating to another country, software developers value companies that respect their labor, private life, and individuality. They emphasize the need to redefine the subordinate-superior relationship, particularly highlighting their desire not to be micromanaged by their managers. Software developers value recognition and appreciation for their work and contributions. They seek a company that acknowledges their skills, expertise, and efforts, providing fair compensation, recognition of achievements, and opportunities for growth based on merit. Respecting work-life balance is crucial to software developers, as they aim for a work environment that acknowledges their personal boundaries and allows them to lead fulfilling lives outside of work. They emphasize that their energy is being consumed by the vicious circle of political and economic debates in Turkey. They demand to live in a country with established democracy, human rights and institutions. They also include their children in their concerns for the future. They aim to provide a quality education in a civilized country. They seek a more collaborative and egalitarian work environment where hierarchical structures are minimized. Instead of a hierarchical relationship, they prefer a relationship based on mutual respect, open communication, and the recognition of each individual's expertise and autonomy.

In terms of macro policies, it is crucial to prevent nepotism and establish institutions that uphold democracy, the rule of law, and transparency in the country. Nepotism, which involves favoritism based on personal connections rather than merit, can hinder the growth and fairness of the software development sector. Therefore, efforts should be made to create a level playing field where individuals are recognized and rewarded based on their skills and qualifications.

Furthermore, in addition to these general regulations, governments can provide support to software companies through tax incentives. Designing specific tax incentives targeted at the software industry can encourage investment, innovation, and job creation in the sector. These incentives can include tax breaks, deductions, or credits that reduce the tax burden on software companies, making it more financially viable for them to expand their operations, hire skilled employees, and invest in research and development.

By implementing such policies and incentives, governments can create an environment that fosters the growth and competitiveness of the software industry. This, in turn, can attract and retain talented software developers, promote technological advancement, and contribute to the overall economic development of the country.

The main asset of software companies is their software developers. Examining the incentive policies for foreign software developers in Ukraine, which has emerged as a leading software hub among developing countries, can provide insights (Ivanenko, 2022). In Ukraine, the corporate tax rate is 18%, which is similar to the corporate tax rate in Turkey (23%). However, if the profits generated by software companies are reinvested, they are exempt from corporate tax. This incentivizes companies to reinvest their earnings for further growth and development, rather than accumulating taxable profits.

In terms of individual taxation, Ukraine has implemented a progressive tax system. For salary payments up to USD 250,000, the individual tax rate is only 5%, with an additional 1.5% income tax. A social security tax of 22% applies only to the minimum wage. As shown in Table 3, for a monthly salary of $5000 paid to a company owner or employee as a software developer, the effective tax rate is only 7.5

These tax incentives in Ukraine create an attractive environment for software companies and developers. They encourage reinvestment, provide lower tax burdens for individuals, and contribute to the growth and competitiveness of the software industry. By considering similar incentive policies, Turkey can potentially enhance its attractiveness to foreign software developers and promote the growth of its software sector.

Table 3. Income Tax Rates of Software Companies in Ukraine (5000 USD)

Gross Salary	5000 US dollars
Income and additional income tax (%6,5)	325 dollars
Social security tax (22% of the minimum wage -250 dollars)	55 dollars
Employee/business owner (5000-325)	4675
Effective Tax rate	%7,5

Source: İvanenko (2022)

In Turkey, the government provides financial support through initiatives such as cheap credit, social housing projects, infrastructure development, and social aid programs. These policies aim to strengthen the industrial sector, reduce income inequality, and promote home ownership. However, these measures alone are not sufficient to lift Turkey out of the middle-income trap and transform it into a high-tech producer. The emigration of 30,000 software developers in 2021 without significant concern being raised reflects the broader societal challenges and priorities. With a substantial portion of the working population earning minimum wage, the focus of the debate and concerns differ (SSI, 2022). The distribution of resources is influenced by the fact that a majority of the electorate consists of less qualified or semi-qualified individuals. As a result, the allocation of resources is not adequately directed towards technology, research, software companies, and software developers, limiting the growth of high-tech industries.

In the context of economic development, it is natural for certain groups to advance while others may face economic inequality. The coexistence of winners and losers raises the question of how the disadvantaged perceive and respond to the situation. Hirschman's "tunnel effect" model suggests that in the short run, those who are at a disadvantage must tolerate economic inequality in order to achieve overall economic growth (Hirschman, 1973; Durongkaveroj, 2018). However, in the long run, all segments of society can benefit from the high value generated by the growing sectors. Increased spending in other sectors by those who benefit from these sectors, coupled with a higher return on education, can contribute to the development of a more qualified workforce.

At the micro level, both the public sector and private firms can design incentive programs to foster employee loyalty. For software developers, who view owning a house and a car as a symbol of success, the public sector can target these sectors and provide long-term loans with no upfront payments. Similarly, firms can establish systems where they provide housing and cars to employees, transferring ownership after a certain number of years of employment. This policy can help prevent employee turnover and offer substantial bonuses at the end of their tenure. As the years of employment increase, the cost of leaving the company and the country becomes higher for the employee as they approach the time of acquiring ownership of the house.

Despite the provision of various fringe benefits, it is crucial to approximate salaries abroad in terms of purchasing power. For instance, in 2021, the per capita income in Turkey is $9,000 (in current US dollars), whereas in Germany, it is $51,000. However, in terms of purchasing power parity (PPP), Turkey's per capita income is $40,000, while Germany's is $58,000 (World Bank, 2022). Equalizing salaries based on the purchasing power parity of qualified professionals can be a viable approach.

Offering stock options can be one of the best solutions to address the shortage of technical staff in startups. Stock options grant employees the right to purchase company shares at a predetermined price in the future. This incentive aligns the interests of employees with the success of the company, fostering a sense of ownership and motivating them to contribute to the growth and success of the startup.

Software developers highly value providing their families with good education and healthcare. Companies can

consider covering educational expenses, including certifications, particularly for senior positions, as part of the employee benefits package. This investment in employees' children's education creates a strong bond between the parents and the company. Demonstrating support for employees' families, including access to quality healthcare, further enhances employee satisfaction and loyalty. Software developers have the advantage of being able to work regardless of location. Providing employees with the opportunity to work remotely or become digital migrants can significantly improve their work-life balance. This flexibility allows them to choose their preferred location and set their own schedule, leading to increased job satisfaction and overall well-being. Additionally, the opportunity to experience different parts of the world while working can be an appealing side benefit, enhancing personal growth and experiences.

Establishing clear guidelines for communication channels and working hours can contribute to a positive work environment. Company executives and customers should have designated hours and channels during which they can reach the company. Introducing a dual phone system and requesting employees to switch on their work phones only during work hours can help maintain a healthy work-life balance. Furthermore, creating an environment that encourages employees to take vacations, join clubs, or invest in their hobbies can enhance overall job satisfaction. Happy working conditions encompass more than just financial income, and companies can foster a culture that supports employees' personal well-being.

While the current study focused on the migration of software developers and engineers, there is potential for future research to explore the broader issue of technical staff shortages, particularly within companies and startups. This research could investigate factors such as the demand-supply gap, skill mismatches, recruitment challenges, and the impact on company growth and competitiveness. Evidence-based insights and recommendations from such research can inform policymakers and industry stakeholders, leading to the development of targeted policies and initiatives to address the shortage of technical talent. These may include educational reforms, upskilling programs, talent attraction strategies, and support for startups in acquiring the necessary technical workforce.

Ethics Committee Approval: There is no need for an ethics committee certificate because the research was conducted from open sources.

Peer-review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study- M.Ş.A., E.K.; Data Acquisition- E.K., M.Ş.A.; Data Analysis/Interpretation- E.K., M.Ş.A.; Drafting Manuscript M.Ş.A., E.K.; Critical Revision of Manuscript- M.Ş.A., E.K.; Final Approval and Accountability- M.Ş.A., E.K.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

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How cite this article

Akin, M.S., & Karadas, E. (2023). Reasons behind the migration of highly qualified employees from Turkiye: the case of software developers and engineers. *Journal of Economy Culture and Society, 68,* 97-110. https://doi.org/10.26650/JECS2023-1229036