

## Original Research Article

# The Role of FDI Attraction Determinants with an Approach to Technology Transfer in Iran

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The urgent need to provide capital from developing countries and improve the level of technology has made it necessary to attract foreign investment. FDI can respond to this need as an inflow of capital, technology, and technical know-how. The present study investigated the role of FDI attraction determinants through a technology transfer approach comprehensively and coherently. This research was conducted using a quantitative paradigm and a cross-sectional survey among experts. The statistical population consisted of Iranian experts, practitioners, and executives in investment and economics. The convenience sampling method was used to study 310 members of the statistical population. A researcher-made questionnaire was also used for data collection. The validity was determined using experts' views, and its reliability was determined using Cronbach's alpha within a pre-test (n=20). Data were analyzed through the partial least square structural equation modeling (PLS-SEM) method in Smartpls 3 software. The hierarchical component analysis (using two orders of constructs) was used to reduce the complexity of the structural model. The results showed that "international relations and agreements" as a primary variable correlated with FDI attraction, and "bureaucracy and domestic laws" significantly affected FDI attraction. In addition, the results indicate that "sanctions," "economic stability and security," and "workforce" are among the economic components that play a less significant role in FDI attraction.

**Keywords:** Foreign Direct Investment, FDI Attraction, Technology Transfer, International Relations and Agreements

**JEL Classification:** O19, O20, O30

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## 1 Introduction

Foreign direct investment (FDI) means investing to make a viable profit through the operations of an enterprise other than economic investment. In this investment, the investor aims to have an active and influential role in managing the company. FDI is one of the international financing channels. In recent years, many economic studies have been devoted to foreign investment. This phenomenon has been studied from various aspects, such as prerequisites, requirements, consequences, spatial and geographical aspects, etc. (Vo, 2020). Capital is a driving force for economic growth and development in all economic theories and models. Providing foreign financial resources is considered one of the main concerns of governments and monetary policymakers, especially in developing countries. Decisions on financing practices, capital structure, and capital composition are some of the most powerful tools of government financing. If we divide financial resources into two parts, internal and external capital, in that case, the developing countries face many problems due to the low level of national savings and population growth to provide the necessary capital and capital from domestic sources to implement extensive development plans (Barmaki & Anvari, 2017). Therefore, financial resources are necessary to launch and support industrial and infrastructure projects. It is sometimes impossible to achieve long-term economic goals and high levels of growth and development without capital. Domestic facilities are insufficient to raise capital to meet economic growth rates in developing countries. Hence, these countries must provide the required capital deficit from foreign sources, which can justify attracting foreign investments. Foreign investment is generally divided into FDI and FPI (foreign portfolio investment) (Jamali et al., 2010). On the other hand, FPI is a short-term practice, mainly in borrowing from external sources, which does not interfere with implementing the project. It does not make financial obligations and only earns profit in case of profit or loss of the project based on its share (Ahmadzadeh & Zarouni, 2017).

The importance of FDI and the interest in examining its causes and consequences have led to the development of assumptions to explain transnational corporations' desire to FDI, select a particular country, and use a specific way to enter a specified country. These assumptions include perfectly and imperfectly competitive market-based assumptions (Jamali et al., 2010). Theories such as different rates of return on investment (Jamali et al., 2010), diversity in the composition of assets, and production and market size theories (Zomordian et al., 2018) are based on a perfectly competitive

market-based assumption. Theories such as industrial organization (Nayyar, 2014), internalization (Jamali et al., 2010), location theory (Popovici & Călin, 2014), eclectic theory (Dunning, 1973), product life cycle (Popovici & Călin, 2014), Uppsala internationalization model, and psychological distance (Zolghadr, 2009) are related to an imperfectly competitive market-based assumption. Theories related to the causes of FDI are not limited to the above theories. The Kindleberger Market Inefficiency Model (Popovici & Călin, 2014), Theory of Institutional Adjustment, New Business Model (Markusem & Maskus, 2002), Knowledge-Capital Model, and Transaction Cost Approach (Nayyar, 2014) are among the recent theories. Theories related to FDI implications include classical, dependency, and middle path theories. Technology transfer is considered a process by which scientific and technical skills and competencies flow from the host country to the applicant country, which is one of the core issues of FDI. FDI equipped with technology transfer lays a solid foundation for a sustained and dynamic national interest. Countries are looking for investors and investees to secure their interests. Foreign countries seek to develop their interests in other countries. Investable countries also try to ensure and increase their national resources by attracting foreign capital while guaranteeing profits for foreign investors. Investable countries are very different in governing laws and regulations in political, economic, social, and cultural dimensions. Furthermore, political relations between investors and investees and possible tensions between them will directly affect the reduction and elimination of investment. The flexibility of investment practices, on the one hand, and the adaptability to the problematic conditions of investors, on the other hand, will increase the importance of finding a suitable model. Numerous internal and external factors play a role in FDI attraction. According to research, ROI, infrastructure, and human capital (Moshiri & Kianpour, 2013), intellectual property (IP) and legal agreements (ZIAEE & Javadi, 2019), free-market economy, economic stability and security, and cultural and political factors (Hakami, 2016), sanctions, laws and international relations, and foreign agreements (Fadaee & Derakhshan, 2015), etc. are among factors affecting FDI attraction. FDI consequences have also always been considered by domestic and foreign researchers. Some significant FDI implications are economic growth and development (Jahangard et al., 2017), FDI-induced technology spillover (Shahabadi et al., 2012), total factor productivity (TFP), increased R&D potential (Iwasaki & Sukanuma, 2015), and IP protection, foreign technology introduction, and FDI based on China provincial-level panel data (Dai, 2020).

In a general classification, the essential elements of FDI attraction are divided into internal and external factors. Essential elements have a significant effect on FDI encouragement and attraction. However, the role and importance of the components are not the same. Some factors play a more prominent role, while others play a less significant role. In addition, some elements may take precedence over others in role-playing. Determining the role-playing weight of factors is one of the research results. While some of these factors have affirmatively positive roles, the role of others is negative, and the role of the third party may be negative or positive depending on how they are used. For example, redundant bureaucracy is an internal factor that plays a negative role, and economic stability, national market size, and access to regional markets play a positive role. Among internal factors, skilled, experienced, and cheap labor in the host country plays a positive role, and unskilled, inexperienced, and expensive workforce plays a negative role. This study seeks a suitable model for the Iranian context that includes long-term national interests. According to the preliminary investigations by researchers, no research has been conducted to provide an appropriate model of FDI attraction with a technology transfer approach to determine the role of internal and external factors in the Islamic Republic of Iran. Researchers conducted this study for the first time in the country. Thematic literature mainly examines one or more influential factors in a general or specific statistical population (Shahabadi et al., 2012; Moshiri and Kianpour, 2013; Ziaee & Javadi, 2019; Hakami, 2016; Fadaee & Derakhshan, 2015; Dai, 2020; Iwasaki and Suganuma, 2015). However, technology transfer under sanctions, weak infrastructure, IP protection, and legal agreements is less considered consistently. The present study examines various internal and external FDI-related factors to fill this research gap in the prevailing literature. The study also determines the importance of each factor from the practitioners' perspective and provides in-depth insights into FDI attraction planning and policy-making in Iran. Therefore, by examining the theoretical foundations of FDI and reviewing the domestic and foreign literature, the necessary data were obtained based on a cross-sectional survey and distribution of questionnaires among Iranian managers, experts, and economic practitioners. The research findings were also analyzed using structural equation modeling, hierarchical component analysis, and two levels of constructs.

## 2 Theoretical Foundations

FDI theories are generally divided into two categories: FDI consequences and FDI causes (Ahmadzadeh & Zarouni, 2017). Theories related to FDI

consequences fall into three categories: classical theory, dependency theory, and middle path theory (Jamali et al., 2010).

Classical economic theory holds that foreign investment is beneficial to the host economy. This theory offers flowing reasons to explain its view: FDI leads to the introduction and dissemination of technology, increases employment opportunities, builds skills in the workforce, transfers management skills, builds infrastructure facilities through foreign investment, and improves facilities such as transportation, healthcare, and training. Contrary to the classical theory, the Dependency theory believes that FDI does not lead to economic development. This theory focuses on the fact that since multinational corporations make the most FDI, they pursue global policies concerning their parent company and shareholders in the home country and work in their best interests. According to this theory, FDI is more likely to depend on developing countries permanently. Unlike the classical theory, the middle path theory recognizes the host country's right to legislation for the FDI process (Jamali et al., 2010). UNCTAD (1999) defines FDI as an investment involving long-term relations that reflect the ongoing control and benefit of a natural or legal entity residing in a country in a company outside the investor's homeland (Jamali et al., 2010).

Theories on the FDI causes are broadly divided into two categories: (1) theories based on perfectly competitive market assumptions and (2) theories related to the imperfectly competitive market (Ahmadzadeh & Zarouni, 2017). Theories based on perfectly competitive market assumptions include the theory of different rates of return on capital, portfolio (asset) diversification, production, and market size (Zomordian et al., 2018).

The rate of return on capital theory argues that since capital flows are transferred from lower-yielding countries to higher-yielding countries, FDI moves from one country with lower expected marginal returns to another with higher marginal returns (Jamali et al., 2010). In asset diversification theory, the risk is also considered besides the expected rate of return. Therefore, FDI can be done with this international asset diversification theory company-wide. In production and market size theory, the volume of FDI in the host country depends on the market size. According to this theory, whenever the size a market of country reaches an extend that makes it possible to benefit from economies of scale, that country becomes a potential target for FDI inflows (Zomordian et al., 2018). Theories related to the imperfectly competitive market include industrial organization, internalization, location-based, eclectic paradigm, product life cycle, and the Uppsala international model and psychical distance. According to industrial organization theory, having unique

resources and capabilities, including distinctive products, proprietary technology, management skills, better access to capital, and market distortions imposed by the government, creates a competitive advantage over indigenous corporations in the host country for transnational corporations and helps them compensate for the disadvantages of operating in a foreign country. The disadvantages stem from language, culture, legal system, and other differences between countries (Nayyar, 2014). According to internalization theory, FDI occurs due to companies replacing market exchanges with domestic exchanges. According to this theory, due to the long-time delays and transaction costs associated with buying and selling in the market, companies replace some of the market functions with internal processes - that is, internal corporate transactions (Jamali et al., 2010). According to location-based theory, FDI occurs due to the non-transferability of certain production factors, such as labor and natural resources. In this theory, labor wages, access to raw materials, and cheap production inputs attract FDI.

Previous location-based theories have changed extensively with the distinctive features of inland activities, including exchange rates, political risks, transnational laws and policies, and cultural differences. New determinants include transportation costs depending the geographical distance of the countries, innovative and knowhow based criteria, as well as domestic coalition, etc. Thus, spatial benefits are based on resources created, such as IP, innovative systems, and organizational and communication infrastructure (Popovici & Călin, 2014). The eclectic paradigm in international production, also known as the ownership, location, internalization (OLI) model or OLI framework, was founded by John H. Dunning (1973). This theory considers FDI to result from the ownership of certain benefits (revenue-generating sources) by a company that intends to discover them in external locations. It cannot profit from them other than internalization (Dunning, 1973). The eclectic nature of this paradigm is created by combining elements of different concepts: international trading, place of making the investment, economic monopoly, internalization privileges and ownership privileges (Nayyar, 2014).

In product life cycle theory, FDI is considered a reaction to the threat of losing the market due to maturity and the need for low-cost inputs to compete. There are three steps in the product life cycle: (1) a new and innovative product is sold in the domestic market, (2) the product is exported after standardization and has economies of scale advantage, and (3) the company decides to set up subsidiaries in another country to receive cheaper inputs and reduce production costs because their overall goal is to reduce costs (Popovici

&Călin, 2014). A group of researchers introduced the internationalization model at Uppsala University in Scandinavia. Johanson and Vahlne, the most famous scholars of this paradigm, believe that companies lack an advantage over local competitors due to their unfamiliarity with local market conditions. According to them, although companies can buy objective knowledge, empirical knowledge cannot be purchased. However, it should be experienced directly, which will be acquired with the effective presence of foreign countries. One of the main components of Uppsala's internationalization model is "psychic distance." The model emphasizes that cultural differences, language, education level, and economic development between the parent country and the host company significantly impact companies' decisions to invest abroad. With more psychic distance, no foreign company will be willing to invest in full ownership (Zolghadr, 2009).

Along with the above theories, other theories, models, and matrices have been proposed regarding the cause of FDI. The Kindleberger market imperfection model cites market imperfections as an existential reason for FDI, including commodity and capital market imperfections. These imperfections are due to differences in marketing techniques, product differences, various accesses to the capital market, technology-driven assets (patents), differences in management specialties, and changes due to government interventions (tariff and non-tariff barriers, taxes, price and profit controls, unreliable regulations, etc.) (Popovici &Călin, 2014). Wilhelms and Witter (1998) developed the institutional FDI fitness theory. According to them, institutional factors can be changed through government actions such as legislation and enforcement procedures. A country's capacity to absorb FDI depends on its adaptability to domestic and foreign economic agents. This theory refers to four institutions capable of fitness: governments, markets, education system, and social and cultural context. The new business model is an alternative to traditional business theories and describes real commercial flows. This model initially focuses on returns to scale, market imperfections, and product differentiation. According to this model, foreign investors determine their location based on comparing production focus to achieve economies of scale and the commercial costs of production in countries close to their home market. This idea is used to classify FDI into two categories: horizontal FDI and vertical FDI (Johnson, 2005). The knowledge capital model includes trade costs, deterministic and relative differences between countries, and investment impediments. This model refers to the complete liberalization of trade and investment to increase the host country's wealth. One aspect of this model is knowledge, which shows that production units in

different geographical areas need a highly skilled and dynamic workforce (Markusem & Maskus, 2002).

The transaction cost approach was founded by Ronald Coase (1937) and developed by Williamson (1979). According to this approach, FDI is an organizational response to the capital market imperfections, intermediate goods, and knowledge markets faced by transnational corporations. The foreign market available to transnational corporations cannot provide an efficient environment where firms can benefit from their proprietary technology, knowledge, brand name, and manufacturing processes. Thus, the company establishes a domestic market by investing in multiple countries, creating the market needed to achieve its goals (Nayyar, 2014).

Given the theories put forward, it can be argued that no theory is superior to other theories and can fully explain the cause of FDI. However, each theory has been enlightened by focusing on areas' specific dimensions.

### 3 Research Literature

In a cross-country study on the determinants of FDI attraction in 209 countries from 1970 to 2000, Moshiri and Kianpour (2013) concluded that the open rate of return on investment, infrastructure, human capital, and investment volume had a positive effect on FDI attraction and government spending, corruption, and inflation had no significant effect on FDI attraction.

Fotros and Emami (2012) examined the factors affecting FDI in Iran, emphasizing patents. Their results showed that human resources, natural resources, economic infrastructure at the level of a liberal economy, and patent protection had a positive and significant effect on FDI attraction. This study also confirmed the positive effect of adopting the FDI protection and expansion law in 2003 on FDI. In contrast, the results of this study indicated that government size negatively affected FDI.

Shahabadi et al. (2012) investigated the effect of FDI-induced technology spillovers on the performance of the industrial sector in the form of economic development plans from 1995 to 2009. Research shows no strong correlation between human capital promotion, FDI attraction, spillover effects, and industry performance during the Second Development Plan. In contrast, during the Third Development Plan, this relationship is significant, which can be attributed to the political obligation of this plan to promote the role of R&D at the macroeconomic level and the adoption of a new FDI Protection and Expansion Law in 2003 and implement a policy to reduce monopoly and ownership in the economy.

Jahangard et al. (2017) studied the effect of FDI on Iranian economic growth based on the development of the Pohjola model. According to theoretical foundations, the results indicated that FDI did not explain the Iranian economy's economic growth in the short and long term and even harmed economic growth. It could be caused by the lack of necessary infrastructure, inappropriate and excessive rules and regulations, inability to absorb technology and transfer of know-how, mismanagement of FDIs due to the comparative advantages of the country and industries with high backward and forward links, incompatible business environment, non-compliance of long-term economic strategy, managerial problems, and executive inconsistencies.

Esfandyari (2015) discusses the role of financial market development in the impact of FDI on economic growth (D-8 case with an emphasis on Iran). The results show that the positive impact of FDI on economic growth depends on the attraction capacity of each country. One of the primary capacities is financial development. Also, domestic investment is more capable of economic growth than foreign investment. Indeed, utilizing existing facilities requires identifying national resources and long-term planning based on these countries' principles and rules. In this regard, due to the poor performance of financial markets, it is necessary to apply effective laws and policies to allocate resources optimally. The formation of D-8 common financial markets also plays a prominent role in improving the economic strengths of these countries.

In their study of analyzing the short-term and long-term effects of sanctions on Iran's economic growth, Fadaee and Derakhshan (2015) sought to identify criteria and determine the weight of sanctions imposed on Iran to examine their impact as a complex variable on economic growth. The short-term estimates showed that weak sanctions did not significantly affect economic growth. However, medium and severe short-term sanctions negatively affected economic growth. The results also showed that weak and severe long-term sanctions did not significantly affect economic growth—however, medium sanctions negatively affected economic growth in the long run.

ZIAEE & Javadi (2019) studied IP protection in FDI international law. Their study seeks to determine whether foreign IPs as "foreign capital" can also be protected in FDI law, and if so, what are the scope and examples of protecting these IPs compared to these two legal systems? Their research results indicate that FDI protection requires IP protection, and in turn, IP protection is an essential factor for FDI attraction. It should be noted that IP

protection in FDI agreements compensates for the non-membership of some countries in some essential IP agreements.

Makoni (2015) explored FDI theories to identify and examine fundamental investment theories and first addressed the history and origins of FDI theories. According to this study, FDI theories are classified based on macroeconomic and microeconomic perspectives. FDI theories emphasize country-specific factors in macroeconomics; they are firm-specific in microeconomics and focus on ownership and internalization interests. There is also no superior theory that comprehensively explains FDI.

Šivickienė (2019) conducted a study to identify the main FDI theories. According to this study, despite the extensive efforts of researchers to explain the phenomenon of FDI, it can still not be claimed that there is a generally accepted theory. New evidence adds new elements and criticisms to previous ones. This study shows that all the different FDI approaches agree that a company will not be transferred abroad unless it benefits from transfer outcomes in location, specific company, or internalization of markets. In addition, all theories prove that government policies in the domestic economy play an essential role in encouraging companies' international investment.

In their study, "Foreign direct investment and regional economic development in Russia: an econometric assessment," Iwasaki and Suganuma (2015) examined the impact of FDI on total factor productivity (TFP) in the Russian regions, with particular attention to the boom in investment and the significant regional gap in terms of aggregate FDIs domestically. The study results show the significant role of FDI in Russian regional economic development. In addition, this study shows that the positive effect of FDI on TFP is increasing in areas with higher amounts of foreign capital. This study also identifies a surprisingly solid and positive synergistic effect between FDI and local R&D potential.

Dorozynska and Dorozynski (2015) evaluated the role of human capital in attracting FDI in the light of empirical studies in Poland and internationally. The results of this study, emphasizing that FDI attraction has become one of the critical components of national strategies for Middle Eastern countries, indicate that achieving a certain level of education is a precondition for a country to absorb and retain FDI. The presence of foreign investors also helps improve employee performance, and the implementation of new organizational strategies has put pressure on staff training abroad.

In their study, Pant and Mondal (2010) examined the relationship between FDI, technology transfer, and technology spillover in India. This study suggests that foreign presence and its effects are more likely to cause

technology transfer than attempts to purchase foreign technology. In addition, technology transfer and spillover depend on the absorptive capacity of domestic companies. This capacity will be reflected in R&D costs. Regarding the impact of institutional factors on spillovers, research demonstrates that the more competitive the industry, the more extensive the technology spillover. While high attraction capacity and foreign presence positively affect technology spillover, this effect is emphasized by the competitive environment. The government is essential in stabilizing technology transfer to local companies.

Dai (2020) develops static and dynamic panel models of 30 provinces in China using various regression models and methods to examine the impact of China's IP protection on FDI. This study shows that the level of IP protection law and the level of IP protection enforcement significantly impact FDI inflows into China. The higher the IP protection legislation and enforcement level, the more FDI inflows into China. However, suppose the combined effect of foreign technology imports and the level of IP protection is considered. In that case, the areas with the highest level of foreign technology imports are the areas that urgently need the introduction of advanced foreign technology. For these areas, strengthening IP protection prevents FDI inflows.

#### **4 Research Methodology**

The present study was based on a quantitative paradigm and conducted a cross-sectional survey among experts. The statistical population consisted of all domestic (Iranian) experts, practitioners, and executives of investment and economics. We attempted to limit the population by work experience to obtain accurate data with high reliability. Therefore, at least five years of work experience was considered a necessary criterion for including respondents in the population. The conventional 10-times rule in partial least squares-structural equation modeling (PLS-SEM) was used to determine the sample size (Hair et al., 2017b). The sample size was ten times the path between constructs based on this rule. Since the number of paths was estimated to be 13, the minimum sample size required to achieve reliable results was 130, which was increased to more than three times (390 to reduce the biases). Out of 390 questionnaires distributed among the respondents, 320 were collected.

After removing incomplete questionnaires with missing data, 310 complete and reliable questionnaires were entered into the analysis. The convenience sampling method was applied for data collection. Experts and practitioners working in the Ministry of Economic Affairs (110 people), the Ministry of Industry, Mines and Trade (20 people), and research centers, universities, and

other executive bodies (180 people) were considered as the study sample members. A researcher-made questionnaire with a 5-point Likert scale was used for data collection. The questionnaire validity was determined using five experts' views, and its reliability was calculated using Cronbach's alpha through a pre-test (n=20) (Table 1). This data was obtained both in-person and online. In the online method, the questionnaire was designed in a digital file. By sending the link to the respondents via email and social networks, they were asked to complete the questionnaire by visiting the submitted link. It should be noted that over 70% of the responses were obtained online.

Table 1

*Constructs and items measured in the research*

<b>Constructs</b>	<b>Number of items</b>	<b>Cronbach's alpha</b>
Workforce	5	0.75
Infrastructure	7	0.77
Liberal economy	12	0.81
Economic stability and security	5	0.79
Bureaucracy and domestic law	8	0.70
Cultural and political factors	9	0.73
National and regional markets	4	0.82
IP	6	0.70
Sanctions	6	0.70
International laws and relations	5	0.81
Foreign relations and agreements	5	0.75
Investor's financial and risk position	6	0.80
Legal agreements	4	0.78

*Source:* Research Findings

The PLS-SEM method was used for data analysis in SmartPLS 3 software. Therefore, the hierarchical component analysis technique was used to reduce the complexity of the structural model. The research model was developed in a reflective-reflective hierarchical structure (lower-order and higher-order constructs) (Hair et al., 2017b). First, the relationship between indicators and their construct was established to move the causal direction from the construct to the indicator (reflective). Then each of the constructs (a total of 13 constructs) was loaded onto a higher-level construct (second-order construct) so that the causal direction was mapped from the second-order construct to the first-order constructs (reflective). The main reason for choosing a reflective-reflective approach in estimating this model is the indicators related to each construct. It means that each indicator associated with each construct can be replaced with other construct indicators.

This model used standardized factor loadings to measure the reliability of indicators. The significance level of factor loadings was determined using the t-statistic. The t-values above the critical level of 1.96 indicate that factor loadings significantly differ from zero at the 5% error level. Generally, factor loadings higher than approximately 0.71 were retained as acceptable loadings in the model. Retaining indicators with factor loadings between 0.40 and 0.71 in the model were subject to their removal and did not affect improving the average variance extracted (AVE). Factor loadings less than 0.4 were removed from the model.

It should be noted that along with factor loadings, the AVE index was also used to explain convergent validity. Values above the threshold of 0.5 for this index confirmed the convergent validity of the construct. The internal consistency of constructs was also evaluated using Cronbach's alpha, which measures the internal correlation of constructs and composite reliability (CR). Values above the threshold of 0.75 for Cronbach's alpha and the threshold of 0.6 for CR were criteria for the internal consistency reliability of constructs (Hair et al., 2017b). The Fornell-Larker criterion was used to evaluate discriminant validity. According to this criterion, a construct has discriminant validity when the square root of AVEs in its original diameter is greater than the correlation between that construct and other constructs (Farooq et al., 2017). The discriminant validity is also examined using Heterotrait-monotrait (HTMT) ratio. As long as the average correlations between the indicators of one construct are higher than the correlations of those indicators on another construct measuring a different phenomenon, it can be seen that discriminant validity is established. The values of this criterion must be less than 0.85. (Henseler et al., 2015)

## 5 Research Findings

The results show that 80% of the respondents (n=248) were men, and 20% (62) were women. Respondents are ranked in three academic degrees: "Bachelor," "Master," and "Doctorate." Most respondents (171) had a master's degree, while 55 and 84 had bachelor's and doctoral degrees. The average age is 45 (minimum and maximum ages are 24 and 71 years, respectively).

As mentioned earlier, the proposed research model was estimated using the hierarchical component analysis technique. Table 2 shows the results of the first-order components (reflective relationship between first-order constructs and indicators (variables)). According to Hair et al. (2017b), a factor loading above 0.701 is acceptable for indicators. However, in some cases where the factor loadings are less than 0.701, the constructs' reliability can be considered

a criterion for dropping or retaining that indicator on that construct. Typically, indicators are retained with factor loadings of 0.4-0.70 if their removal does not increase the AVE. In this study, most factor loadings are higher than 0.7. In cases where these factor loadings are below the threshold, the construct reliability was considered a criterion for dropping or retaining the indicator. For example, in several indicators, the "infrastructure" has a factor loading of less than 0.7 (AC2). Removing these indicators did not increase AVEs, so it was retained in the model. All factor loadings are significant at a 1% error level (t-values above 1.96). It is noteworthy that Cronbach's alpha (CA), CR, and AVE for these constructs are higher than the threshold values of 0.6, 0.7, and 0.5, respectively, indicating that this construct has adequate reliability.

The construct "cultural and political factors" was assessed with nine indicators. Five indicators were retained on this construct after a two-stage model estimation and dropping indicators with low factor loadings. In most cases, factor loadings are higher than 0.7. All factor loadings are significant in this construct. CA, CR, and AVE values for these constructs were calculated to be 0.781, 0.851, and 0.534, respectively, higher than the threshold values for each indicator, indicating construct reliability. Indicators for other constructs, factor loadings, significance levels, and construct reliability can be seen in Table 2.

Table 2  
*Factor loadings, t-values, and construct reliability indices (first-order components)*

Constructs	Indicator	Symbol	Factor loading	t-value	CA	CR	AVE
Infrastructure	Information and software infrastructure leads to FDI attraction by facilitating technology transfer.	AC1	0.622	8.37	0.825	0.870	0.50
	International banking infrastructure and facilitation of cash flow are effective in FDI attraction.	AC2	0.595	7.44			
	Extensive domestic and foreign transportation routes effectively facilitate the transfer of physical technology (equipment).	AC3	0.690	15.54			
	Extensive and favorable communication infrastructure is affecting know-how and FDI attraction.	AC4	0.755	17.38			
	Extensive and efficient electronic infrastructure effectively updates and disseminates technology and absorbs FDI.	AC5	0.787	24.07			

Source: Research Findings

	IT infrastructure is effective in facilitating learning in technology transfer and dissemination.	AC6	0.784	24.77			
	The host country's technology acceptance capacity influences FDI attraction.	AC7	0.648	17.97			
Cultural and political factors	Participatory culture influences FDI attraction and spillover.	CL1	0.744	23.30	0.781	0.851	0.534
	Shared culture is a compelling context for FDI attraction.	CL2	0.714	20.61			
	Familiarity of host country companies with foreign languages facilitates FDI attraction.	CL5	0.696	61.78			
	Learning culture is an influential factor in FDI-induced technology transfer.	CL8	0.807	36.71			
	Acceptance of know-how priority in economic planning influences technology transfer and localization.	CL9	0.685	14.02			
Liberal economy	Membership in regional economic organizations encourages companies and countries to invest.	EC2	0.768	22.81	0.802	0.859	0.534
	Membership in international economic organizations encourages international companies to invest.	EC3	0.761	23.12			
	Allowing foreign investors to participate in host companies is an incentive to attract FDI.	EC4	0.734	24.04			
	Avoidance of cumbersome regulations by the host country encourages foreign investors to invest.	EC7	0.684	13.47			
	Fair labor and tax laws reduce foreign investors' concerns about solving working problems and thus attract FDI.	EC8	0.657	13.06			
	Adequate and stable interest rates facilitate trade relations and FDI attraction.	EC9	0.647	11.76			
International laws and relations	Compliance with international economic laws is effective in FDI attraction.	IN1	0.789	20.78	0.875	0.910	0.669
	Adherence to international political rules affects FDI attraction.	IN2	0.867	34.68			
	Compliance with international social laws influences FDI attraction.	IN3	0.845	38.58			
	Membership in international organizations, including World Trade Organization, is effective in FDI attraction and spillover.	IN4	0.814	32.78			
	Communication and membership in regional economic organizations facilitate technology transfer resulting from FDI attraction.	IN5	0.770	23.74			
Investor's financial and	The foreign investors' willingness is a growing factor in FDI	IV2	0.595	9.71	0.75	0.835	0.506
	The host country's business risks influence the investment decisions of foreign investors.	IV3	0.807	31.57			

	The host country's increased financial and credit risks affect foreign investors' investment decisions.	IV4	0.793	28.32			
	Increased insurance tariffs by international insurance institutions affect FDI.	IV5	0.624	11.52			
	Increasing risk factor by international risk assessment agencies affects FDI and technology transfer.	IV6	0.713	17.53			
Workforce	Workforce technical skills can lead to FDI acquisition by increasing the likelihood of technology transfer.	LU1	0.735	12.96	0.65	0.806	0.580
	HR expertise and know-how influence the technology transfer and FDI attraction.	LU2	0.802	15.78			
	An efficient HR improves the facilitation and management of technology transfer and FDI attraction.	LU5	0.747	18.16			
National and regional market	The national market's magnitude influences FDI attraction.	M1	0.672	14.71	0.744	0.840	0.568
	The host country's access to regional markets effectively attracts foreign investors.	M2	0.795	23.96			
	Technology transfer becomes available with access to regional markets.	M3	0.803	24.35			
	The host country's political and economic agreements with regional markets make establishing and maintaining FDI easier.	M4	0.737	19.69			
Economic stability and security	The inflation rate and its fluctuation are effective in FDI attraction.	MEC1	0.533	8.45	0.685	0.806	0.516
	Exchange rate fluctuations affect transferable technology equipment costs and FDI attraction.	MEC3	0.668	12.22			
	Economic security encourages foreign investors to invest and transfer technology.	MEC4	0.817	24.13			
	Economic stability is essential in technology transfer's managerial and know-how dimensions.	MEC5	0.815	24.08			
Foreign relations and agreements	Political relations facilitate FDI attraction between host (investees) and guest (investors) countries.	PO1	0.735	17.32	0.818	0.873	0.580
	The mutual promotion and protection of investments between investor and investee countries cause technology acquisition and transfer.	PO2	0.815	26.78			
	Dispute settlement mechanisms between the host country and foreign investors play a critical role in FDI persistence.	PO3	0.763	15.69			
	Addressing political risk concerns affects foreign investors' willingness to FDI.	PO4	0.737	21.47			
	Foreign technology transfer agreements attract FDI.	PO5	0.754	17.79			

Bureaucracy and domestic law	Excessive paperwork is a barrier to FDI and technology transfer.	RE1	0.677	16.54	0.859	0.890	0.504
	Time-consuming regulations and formalities deter acquiring investment and technology transfer on time.	RE2	0.747	18.30			
	The high cost of redundant formalities and regulations increases FDI costs and reduces attraction.	RE3	0.710	16.12			
	Corruption affects the managerial dimensions of technology transfer and prevents FDI attraction.	RE4	0.659	16.22			
	The complexity of the host country's laws negatively affects foreign investors' FDI decisions.	RE5	0.710	14.73			
	Inefficient management is a barrier to know-how transfer in FDI attraction.	RE6	0.733	19.53			
	Government monopolies limit FDI attraction and spillovers.	RE7	0.690	19.314			
	(Unjustified) bureaucracy makes technology transfer difficult by harming the organization and human capabilities.	RE8	0.748	21.10			
Legal agreements	The host country's legal protection of foreign investors' IP is influential in technology transfer.	RI1	0.807	32.53	0.800	0.870	0.626
	An appropriate and robust legal mechanism to support economic agreements between host and investor countries establishes and sustains FDI and its spillover effectively.	RI2	0.801	36.10			
	Membership in international IP conventions affects FDI attraction.	RI3	0.828	31.06			
	Membership in international IP conventions is effective in countering know-how sanctions.	RI4	0.726	22.16			
Sanctions	Sanctions restrict FDI-induced technology transfers between countries.	SA1	0.826	24.55	0.785	0.856	0.522
	Sanctions drastically reduce financial transfers for investor-investor investment.	SA2	0.838	21.80			
	Sanctions restrict the scope of foreign markets for the host country.	SA3	0.853	24.82			
	Sanctions reduce the expansion of joint ventures and restrict FDI attraction.	SA4	0.844	24.26			
	Joint ventures are a barrier to sanctions and expansion, reducing FDI attraction.	SA5	0.340	4.73			
	Regional and international agreements limit sanctions and their expansion.	SA6	0.437	6.77			
IP	The adoption of IP is effective in absorbing FDI.	TH1	0.797	27.53	0.888	0.915	0.644
	IP is effective in facilitating technology transfer.	TH2	0.836	36.74			

Adopting know-how as an asset by the host country stimulates foreign investors.	TH3	0.779	30.30		
The know-how valuation index affects FDI attraction.	TH4	0.708	20.70		
IP plays an essential role in acquiring the right technology.	TH5	0.848	45.75		
IP influences the development and dissemination of technology transfer.	TH6	0.8383	40.16		

The Fornell-Larker criterion and HTMT ratio were used to test discriminant validity. Table 3 represents that the square root of AVEs on the original diameter is larger than the correlations (below the original diameter). For example, the AVE square root for "infrastructure" is 0.701, which is greater than the correlations of this construct with other constructs (e.g., the correlation of "infrastructure" with "cultural and political factors" is 0.472, etc.). The HTMTs are above the original diameter, less than 0.85 for all constructs. Both of these indicators confirm the discriminant validity of the constructs.

Table 3

*Discriminant validity using Fornell-Larker criterion, correlations, and HTMT ratio*

Constructs	1	2	3	4	5	6	7	8	9	10	11	12	13
Infrastructure (1)	0.701	0.573	0.757	0.627	0.608	0.719	0.668	0.796	0.678	0.689	0.650	0.479	0.497
Cultural and political factors (2)	0.472	0.731	0.588	0.523	0.593	0.580	0.794	0.423	0.718	0.742	0.677	0.461	0.719
Liberal economy (3)	0.620	0.469	0.710	0.722	0.693	0.517	0.703	0.661	0.804	0.765	0.688	0.585	0.524
International laws and relations (4)	0.537	0.438	0.609	0.818	0.698	0.475	0.640	0.471	0.767	0.589	0.795	0.589	0.523
Investor's financial and risk position (5)	0.483	0.448	0.538	0.565	0.712	0.488	0.785	0.620	0.849	0.722	0.772	0.622	0.676
Workforce (6)	0.533	0.422	0.383	0.369	0.356	0.762	0.522	0.546	0.467	0.513	0.516	0.332	0.413
National and regional markets (7)	0.533	0.609	0.547	0.518	0.585	0.366	0.754	0.509	0.806	0.751	0.639	0.577	0.685
Economic stability and security (8)	0.613	0.323	0.483	0.373	0.453	0.392	0.381	0.718	0.541	0.664	0.471	0.479	0.352
Foreign relations and agreements (9)	0.567	0.580	0.651	0.650	0.666	0.356	0.633	0.417	0.761	0.741	0.783	0.631	0.580
Bureaucracy and domestic law (10)	0.592	0.619	0.637	0.516	0.581	0.403	0.610	0.520	0.624	0.710	0.689	0.497	0.606
Legal agreements (11)	0.533	0.538	0.558	0.667	0.598	0.392	0.494	0.372	0.639	0.581	0.791	0.485	0.737
Sanctions (12)	0.389	0.351	0.458	0.488	0.479	0.242	0.444	0.374	0.503	0.410	0.375	0.722	0.420
IP (13)	0.432	0.608	0.451	0.465	0.549	0.326	0.562	0.287	0.504	0.537	0.624	0.334	0.802

Note: Values on the original diameter = AVE square roots; values below the original diameter = correlations; and values above the original diameter = HTMTs

Source: Research Findings

Table 4 presents the factor loadings and significance level of the second-order components. The final model with factor loadings are shown in Fig.1. Table 4 and Fig.1 show that "foreign relations and agreements" (POC) has the highest factor loading on FDI attraction (VC). Then, "bureaucracy and domestic law" (REC) has the highest factor loading on FDI. Liberal economy (ECC) and legal agreements (RIC) have factor loadings of 0.788 and 0.782, respectively, on FDI attraction. The "workforce" has the lowest factor loading (0.540) on FDI attraction. It should also be noted that all factor loadings are significant at the 1% error level. Therefore, it can be seen that all constructs play an essential role in absorbing FDI.

Table 4

*Factor loadings, t-values (second-order components)*

Second-order construct	First-order construct	Factor loading	t-value	p-value
FDI attraction (VC)	Infrastructure (ACC)	0.765	18.63	0.00
	Cultural and political factors (CLC)	0.724	24.44	0.00
	Liberal economy (ECC)	0.788	28.76	0.00
	International laws and relations (INC)	0.766	28.33	0.00
	Investor's financial and risk position (IVC)	0.766	26.54	0.00
	Workforce (LUC)	0.540	9.74	0.00
	National and regional markets (MC)	0.764	27.84	0.00
	Economic stability and security (MECC)	0.603	9.41	0.00
	Foreign relations and agreements (POC)	0.828	43.60	0.00
	Bureaucracy and domestic law (REC)	0.821	35.02	0.00
	Legal agreements (RIC)	0.782	31.61	0.00
	Sanctions (SAC)	0.606	9.95	0.00
	IP (THC)	0.718	25.42	0.00

Source: Research Findings

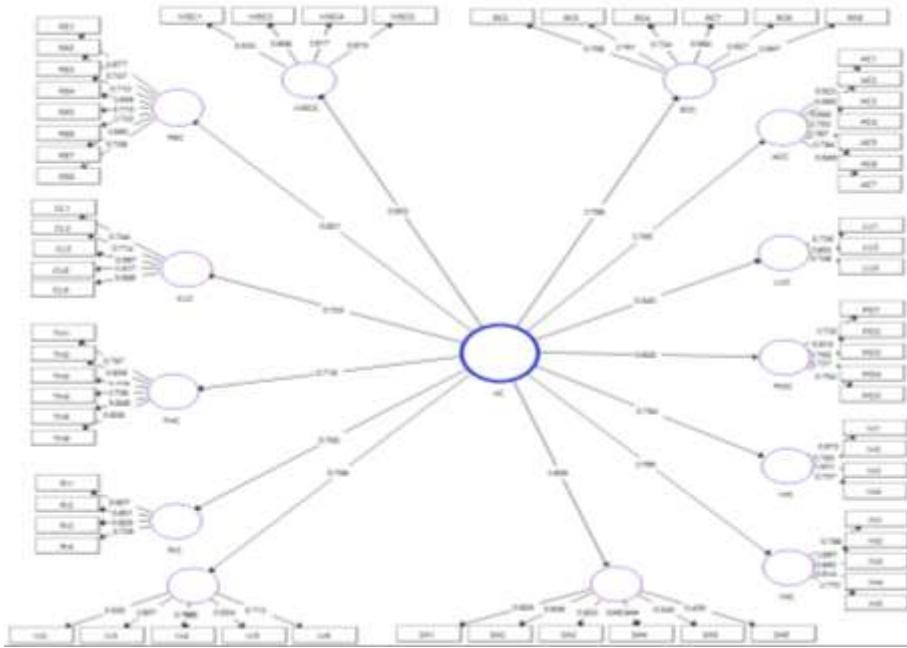


Figure 1. FDI attraction hierarchical component model

Source: Research Findings

## 6 Conclusion

The critical role of FDI in Iran has made it necessary to study its determinants. Therefore, the research aimed to explore the role of factors affecting FDI attraction with a technology transfer approach. The results showed that "foreign relations and agreements" as the primary variable affect the FDI attraction, which can be interpreted within external factors. Foreign relations and agreements emphasize the interactions of the investor country with the investee country. As long as foreign relations and agreements have an excellent external appearance, technology will be absorbed and transferred easily. The legal, political, and diplomatic contexts are provided for technology transfer. Indeed, in the context of favorable foreign relations and agreements, political risks and conflicts between governments are reduced, and as a result, the propensity for FDI is improved. Therefore, the essential role of foreign relations and agreements in technology transfer during investment is to reduce political and diplomatic risks.

Based on the results, "bureaucracy and domestic law" significantly affects FDI attraction. In fact, with an investor's presence in the political and economic context, these structures will inevitably be adapted to the investor's conditions. If these structures are not flexible enough to achieve this level of compliance, the FDI can be expected to decline. The first commitment of FDI to Iran is to encourage and facilitate financial conditions or, in some other respects, to impose cumbersome and bureaucratic restrictions on FDI attraction. Accordingly, economic policymakers and, at a higher level, legislators should minimize investor risks and facilitate FDI requirements (especially entry requirements and investment security) by reviewing FDI attraction laws.

It should be noted that law enforcement also requires flexibility. In this regard, the government should have an economic view and encourage this type of investment with the help of responsible institutions instead of a security view. However, attracting FDI, both financially and directly, is an opportunity that, if used correctly, will boost business and improve the country's economy. In general, it is suggested that the political and economic structures of investment be adjusted based on the conditions of investors with the most economic activity. Therefore, security considerations must be flexibly shifted to facilitating the legal conditions for FDI attraction.

The results showed that the "liberal economy" significantly affects FDI attraction. In this regard, Chakraborty and Nunnenkamp (2008) also found that economic liberalism in India increased communication between domestic and foreign companies. When a liberal economy is in place, different domestic and foreign companies become more able to communicate, they become members of regional and international economic organizations, and, as a result, they can transfer technology more efficiently. Previous studies (Crespo & Fontoura, 2007; Johnson, 2005; Popescu, 2014) have emphasized the role of the liberal economy and its relationship with technology transfer. According to the findings, it is suggested that the necessary facilities be provided to establish relations between domestic companies and companies that work closely with Iranian economic partners. Therefore, domestic companies must become regional and international economic organizations to act more appropriately in technology transfer.

Based on the results, "legal agreements" are crucial in attracting FDI. Legal agreements are essential in several respects, including the host country's legal protection of foreign investors' IP, appropriate and robust legal mechanisms to support economic agreements, membership in the international IP convention, and membership in the international IP convention in countering

know-how sanctions. According to UNCTAD (2009), investing focusing on technology transfer through rigorous legal contracts results in desirable outcomes. However, the technology transfer process must involve knowledge transfer. Legal agreements in the technology transfer process are essential because they can identify different technology transfer methods. Thus, the investment will be realized more confidently if the technology transfer method can be identified through an appropriate legal contract. Therefore, a legal contract is considered a basis for technology-based investment because the investors tend to transfer technology only based on a secure contract with an executive guarantee. It is also suggested that the laws related to legal agreements be amended based on major foreign investors' requirements and preferences and that the necessary mechanisms be put in place to ensure the enforcement of these laws. The FDI stakeholders must focus on knowledge transfer by choosing appropriate technology transfer practices within legal agreements. It helps stakeholders focus more on guaranteeing the implementation of treaties by taking advantage of technologies.

The results revealed that "international laws and relations" and "investor's financial and risk position" affect FDI attraction. International laws and relations are imperative in various political, economic, and social fields. The countries involved in the FDI must develop political, economic, and social relations to reassure investors. It is even more critical under sanctions because the investment climate in such circumstances is closely dependent on international laws and relations. For example, communication between foreign investors in the face of sanctions requires efficient banking systems to exchange funds.

On the other hand, FDI is closely linked to countries' financial situations. Studies show that the lower the inflation rate in the host country, the lower the asset value and net return on investment, thus reducing investment risk and increasing FDI inflows. Thus, financial balance and economic stability affect economic investment.

According to the research results, "infrastructure" affects FDI attraction. Software and hardware infrastructures are both essential in the FDI attraction process. Software infrastructure includes transferring knowledge, information, technologies, and innovations, while hardware infrastructure includes banking facilities, transportation, etc. There is a positive correlation between infrastructure and FDI inflows. Experimental studies (Wei et al. (1999), and He (2002)) confirmed the importance of economic infrastructure in FDI. The right area with excellent infrastructure is one of the most attractive

factors for FDI attraction (Wei et al., 1999; He, 2002; Raluca & Alecsandru, 2012).

It should be noted that technology transfer-based investment is closely related to infrastructure. Experimental evidence in Libya (Mohamed & Sidiropoulos, 2010) shows that transfer infrastructure is one of the essential elements of the technology transfer model in the FDI process. Therefore, companies involved in FDI are encouraged to provide necessary information facilities, including international networks for knowledge and information transfer and the organizational culture of knowledge sharing for technology transfer. It is also suggested that host countries' governments develop the necessary physical facilities (e.g., roads and banking structures) in the FDI process based on the investment level and context.

The results indicate that the "national and regional market" affects FDI attraction. Indeed, expanding markets nationally and internationally determines how FDI is absorbed. High demand can facilitate FDI attraction. The wider a country's market, or the less saturated it is, the stronger the capital flow to that country will be. Also, according to Chakraborty's theoretical model, market size expansion leads to an increase in FDI through increased demand. A broader market indicates that distribution costs will be reduced if production and distribution facilities are located in a market with many buyers and sellers. Accordingly, the high volume of demand due to the market size and several buyers and sellers indicates unsaturated markets, which play an essential role in attracting FDI.

Based on the results, "cultural and political factors" and "IP" are other determinants of FDI. Cultural factors refer to the convergence of actions, participation, shared learning, customs, and values. In contrast, political factors include social stability, the political structure of society, the type of government - the power of government, and how to make political decisions. The environment is a significant factor that includes the environment that provides and receives technology and cultural, political, and economic factors affecting the recipient and provider of technology (Mohamed & Sidiropoulos, 2010). Thus, the investment environment encompasses a range of cultural, political, and even economic factors. More specifically, cultural, social, political, and economic contexts are among the factors influencing FDI attraction. It is indispensable for tacit knowledge acquisition, which requires cultural convergence because tacit knowledge is transmitted in a friendly and open relationship. Positive political, social, and cultural engagement leads to intimacy and mutual trust. Therefore, it encourages the supplier to offer unique insights, personal experiences, and business secrets (Anderson, 2006).

Based on the research results, it is suggested that it is indispensable to focus on cultural affinity and political atmosphere for succeeding in FDI attraction. Countries' interactions to attract FDI are based on their degree of alignment with customs, values, learning environment, and political and governance structures.

Finally, according to the results, factors such as "sanctions," "economic stability and security," and "workforce" are among the economic components that play a less significant role in FDI attraction. Sanctions as a tool of economic inefficiency reduce FDI attraction. Sanctions undermine trade relations between countries and, as a result, reduce financial exchanges through technology transfer. Deteriorating world relations with the embargoed country will reduce trust and significantly weaken joint ventures. Weakening financial exchange systems during sanctions also reduces the possibility of investment for countries reluctant to enforce sanctions. Labor also influences FDI attraction in three critical ways: the number of employees, labor wage, and labor skills (Kusluvan, 1998, Zhang & Markusen, 1999). It means that skilled labor with cost-effective wages stimulating investment is an important economic component. Labor skills, along with wages, are crucial to technology transfer. Therefore, technology transfer in attracting investment depends on labor skills. Training to improve technology transfer skills in FDI attraction must be available to the workforce.

Since this study was conducted to identify FDI attraction determinants with a technology transfer approach from the perspective of domestic experts operating at the executive levels, the findings seem to provide in-depth insights for managers involved in FDI attraction policy and planning. Also, by explaining the contribution of FDI determinants, the present study can consistently provide hot spots for FDI planning and management under sanctions.

#### – **Limitations and Directions for Further Research**

Due to time and executive constraints, this study focused only on the views of domestic (Iranian) experts, practitioners, and executives. Since the role of FDI attraction determinants is essential from the foreign investors' perspective and helps understand the issue, it is suggested that future research examines these determinants from the foreign experts' and investors' perspectives to allow a comparative study of different views and reach a more comprehensive conclusion.

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