Transparency of Real Estate Markets: Conceptual and Empirical Evidence

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Abstract

The expansion of international real estate investment has also created the need for more transparency on real estate markets. In this context, the paper aims at identifying the dimensions and trends of the transparency of real estate markets in 31 states, mostly European, in correlation with their economic development. Applying the Principal Component Analysis (PCA), t-Student test and regression analysis highlighted the strong and significant associations of transparency quantified by the Global Real Estate Transparency Index with the institutional environment, macroeconomic factors, technology, innovation and the social environment. The results of the research show that the most competitive and robust countries have the most transparent and mature real estate markets. Technology, innovation, infrastructure quality and expanded business networks imply new trends in transparency in developed countries. In emerging and developing countries, the quality of governance and lack of corruption are prerequisites for transparency in real estate markets.

Keywords: *transparency, Global Real Estate Transparency Index, real estate markets, Europe, competitiveness, corruption.*

JEL Classification: *F21, F62, F63, H50, R11*

Introduction

Globalization has boosted the importance of transparency in real estate markets due to the demand from international investors (Razali and Adnan, 2012). According to CBRE - *Commercial Real Estate Services* (2018), low market transparency is one of the major obstacles to real estate investment. The lack of transparency with opaque and secure financial instruments related to real estate was also one of the main causes of the 2008 financial crisis (Gorton, 2008). Thus, transparency becomes a fundamental factor in the efficient functioning of real estate markets, because it facilitates decision-making and coordinates the actions of market participants. To ensure a transparent business environment, regulatory bodies have a considerable role to play in influencing access to information and, at the same time, can reduce market uncertainties (Banerjee, Davis and Gondhi, 2018).

The purpose of this research is to analyse the transparency of real estate markets from 31 states, most of them European countries, taking into account the factors that literature and practice recognize as the determinants of transparency (institutional environment, macroeconomic environment, technology and innovation, the social environment and the environment surrounding). The hierarchy of their actions and the assessment of the level of association between market transparency measured by the Global Real Estate Transparency Index (GRETI) and the factors/variables of interest are made by principal components analysis (PCA), the t-Student test and regression analysis.

The analysis has shown that the most competitive countries, with a robust institutional environment also have the most transparent markets. For these countries, we can talk about new trends in transparency accentuated by the high level of technology, innovation, infrastructure and extensive business networks. In emerging and developing countries, high transparency must be ensured through the quality of governance and lack of corruption.

The paper respects the basic structure of a scientific article. The review of the literature has made it possible to identify the theoretical link between transparency and the functioning of the real estate market. The research methodology explains the approach and the results, related discussions are presented in a distinct section.

The main contributions of the paper are presented in the CONCLUSIONS part.

1. Literature review

The review of literature aims to outline the link between transparency and the real estate market by researching the concept of transparency and placement in the context of real estate.

1.1. Information transparency – approaches and views

Transparency is a multidimensional concept; its substance propagates in processes of social, economic, political, etc. Transparency is defined and analysed according to the specific area of use (Drew et al., 2004). In literature, transparency is presented either by addressing the information sender or by addressing the information receiver. Authors oriented towards the sender define transparency through the accessibility, availability and clarity of the transmitted information, while the ones oriented towards the receiver emphasize the understanding and perception of information (Wehmeier and Raaz, 2012). Most authors adopt the first approach to define informational transparency.

Baraibar-Diez, Odriozola and Sánchez (2017) and Hillebrandt (2017) differentiate transparency, by content, as value and transparency as a policy (Table no. 1). From the point of view of value, transparency is associated with an ideal state of society, where the rule of law and good governance operate with public decision-making and the free circulation of information. In literature, transparency is correlated with other values such as efficiency, trust, responsibility, autonomy and control, confidentiality, fairness and legitimacy (Heald, 2006, p. 60), accessibility and freedom of information (Birkinshaw, 2006, p. 183). In the context of the European Union, transparency is considered to be the central value of the "democracy cluster" (Hillebrandt, 2017, p. 23). Transparency as a policy is highlighted by the legal rules implemented to facilitate access to information. Information is provided by citizens' access to public documents. These documents, apart from being accessible, must also be reliable, as Lon Fuller (1964) argues in his book "Morality of the Law" (Hood, 2007, p. 194).

Table no. 1. Presentation of transparency as a value and transparency as a policy		
	Transparency as a value	**Transparency as a policy**
Description	Dream	Deed
Nature of claim	Normative: "*as it ought to be*"	Empirical-theoretical: "*as it is*"
Form	Moral, ideal, virtue	Formal rules, practices, informal norms
Examples	"Right to know", "good governance"	"Access to documents", "public register"

Source: Hillebrandt, 2017, p. 21

In addition to the content, transparency needs to be explored contextually also. Baraibar-Diez, Odriozola and Sánchez (2017) think that the most appropriate way to analyse transparency is in the context of elements, such as political means and tools to achieve the objective of transparency. From this perspective, the invoked researchers identify institutional transparency, macro economically analysed, and individual transparency, micro economically analysed.

Transparency derives from the theory of institutionalism (Hood, 2001), which reflects the "sum of constraints" (Pohoață, 2006, p. 4) created by people who "structure political, economic and social interaction" (North, 1991, p.97). These fundamental constraints of the institutions include formal rules, constitution-based, laws, regulations, contracts, property rights, etc. and informal rules, such as conventions, codes of conduct, customs, traditions, etc. with the role of supporting the written ones (North, 1991). In the approach of economic neo-institutionalism, institutional theory "is constructed from a theory of human behavior combined with a theory of the costs of transacting", to which can be added the theory of production for analysing the role of institutions in creating economic performance (North, 1990, p 27). Ronald Coase in the article "The Nature of the Firm" (1937) presents the role of transaction costs in defining the firm and distributing private property rights (Allen, 1999). Transaction costs are costs necessary to inform and reduce uncertainty as a result of the information distributed asymmetrically among market participants (Buitelaar, 2004). At the same time, they generate profit opportunities by harnessing information, engaging creativity and entrepreneurial coordination in the dynamic process of the economy (Huerta de Soto, 2009). Thus, the increase in transaction costs is the result of "institutional innovations", which explains different economic and social development between states (Pohoață, 2006).

Even if there is now increasing interest in transparency, in literature, the concept is more approached as a tool for achieving an objective, and it is difficult to identify a clear definition of transparency. This reflects the "multidimensional nature" of transparency according to the context in which it is used (Baraibar-Diez, Odriozola and Sánchez, 2017, p. 480). Hood (2006, p. 3) states that "transparency is more often preached than practised, more often invoked than defined".

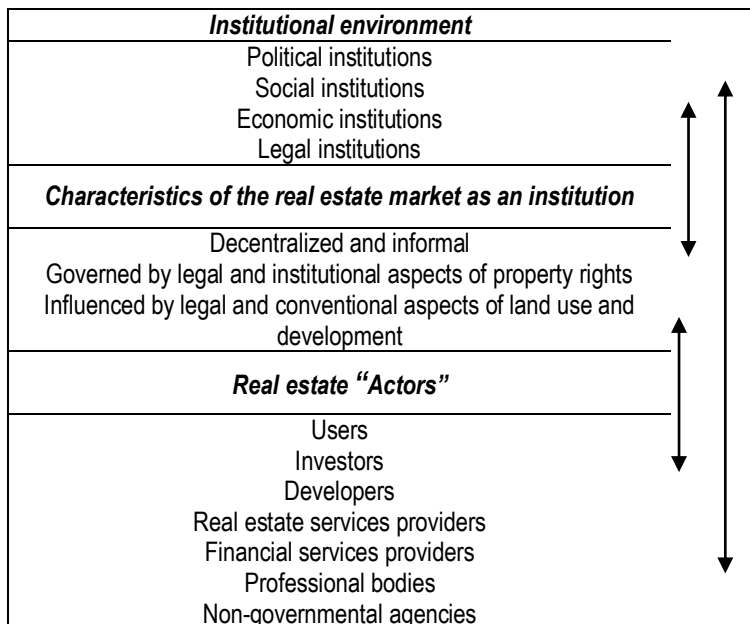## 1.2. Transparency in the context of real estate markets

Schulte, Rottke and Pitschke (2005, p. 91) define the real estate market as transparent "when it becomes clear how the market mechanisms and the variables behind these mechanisms work". O'Hara (1995) refers to the ability of market participants to capture transaction process information to define market transparency. Thus, transparency is perceived both by the availability of information on the market and by the reaction of the participants. In the real estate industry, it is considered that a transparent environment can attract more investors to the market (Razali and Adnan, 2012).

Transparency in real estate needs to be addressed in relation to the intrinsic peculiarities of real estate, which determines the different functioning of the real estate market from that of any other market (Arnott, 1987). The general model of market price competitiveness, developed by neoclassical economists, is inappropriate for the real estate market, due to their specificity. The heterogeneity and location of real estate, which requires high search times and costs for potential buyers, imperfect information often available to market participants, decentralization of transactions, pricing through direct negotiations are some of the elements that characterize real estate transactions (Quan and Quigley, 1991).

The theory of institutional economics defines real estate as a good with multiple features of individual value. In this respect, Keogh and D'Arcy (1999) define the real estate market as an individual entity with its own characteristics, which determines its structure, purpose and function. The authors position the real estate market between the institutional environment and the "actors" operating on the real estate market (**Figure no. 1**). These institutional structures, delimited by their own standards, rules, and laws, relate to generating information flows that create the need for transparency in their delivery.

Figure no. 1. Real estate market in an institutional context

Institutional environment
Political institutions
Social institutions
Economic institutions
Legal institutions
Characteristics of the real estate market as an institution
Decentralized and informal
Governed by legal and institutional aspects of property rights
Influenced by legal and conventional aspects of land use and development
Real estate "Actors"
Users
Investors
Developers
Real estate services providers
Financial services providers
Professional bodies
Non-governmental agencies

Source: Processed by Keogh & D'Arcy, 1999, p. 2407

The process of trading real estate is complex, lasting and with multiple interventions of different entities. The problem of price setting between the seller and the buyer is influenced by the transaction costs. Search costs, legal and administrative costs, adjustment costs, financial costs, and uncertainty costs are reflected in the property transfer process (Quigley, 2003). These costs determine the level of transparency of the real estate market, the higher the costs, the lower the transparency of the real estate market. Thus, the low level of transparency of the real estate market leads to informational asymmetry (Lieser and Groh, 2011). Asymmetric information in the economy is the result of the situation where some partners are better informed than the other participants in the transaction (Akerlof, 1970), leading to distorted results, unlike the efficient Pareto markets promoted by neoclassicals (Marinescu and Marin, 2011). Real estate markets distinguish

sellers with superior information about local market conditions and property characteristics (Garmaise and Moskowitz, 2004). This situation leads to a premium type of liquidity for market participants with a large predominance of private information (O'Hara, 2003). Garmaise and Moskowitz (2004) support the importance of asymmetric information on market conditions in the organization of real estate transactions and the choice of financing option.

In the literature, reduced transparency is often associated with corruption, especially from public administration (Ball, 2009), which influences the real estate market mechanism. Ensuring market participants by facilitating access to reliable information by public authorities will thus enhance market efficiency.

Transparency of real estate markets is directly influenced by the maturity of the markets (Newell 2008).

The mature real estate markets are also the most transparent, reflecting the availability of market information (Keogh and D'Arcy, 1994). According to Keogh and D'Arcy (1994, p. 218), the main features of a mature market, closely related to transparency, are: the wide range of investment objectives; flexibility, both in the short and long term; complex professional environment associated with institutions and networking; expanded information flows and research activities; opening up in space, functional and sectoral terms; standardization of property rights and market practices.

Lindqvist (2012) defines transparency in the process of trading residential property in the European Union through: transparency in transaction procedures, accessibility to information and advice, transparency of property law, building permits and urbanization, transparency in funding, transparency of the taxation system and the transparency of transaction costs. Jones Lang LaSalle (JLL) (2004, 2006, 2018) defines the transparency of the real estate market through an open and organized market, based on a consistent legal and regulatory framework, respect for private property rights, lack of corruption and a competent professional environment.
In 2018, JLL adds a new dimension to transparency about reporting for a sustainable environment. Sustainability of real estate includes green building certificates, energy efficiency, carbon emissions reporting, green leases and financial performance of green buildings. Thus, by respecting and fulfilling these dimensions of transparency, it contributes to the sustainable development of real estate markets and, in general, development of the communities.

1.3. Measuring the transparency of real estate markets

Measuring the transparency of the real estate market continues to be elusive (Hollyer, Rosendorff and Vreeland, 2014). The complexity of measurement derives from the multiple dimensions of transparency that have distinct effects. For this reason, transparency must be appreciated from a context perspective, as recommended by the authors Baraibar-Diez, Odriozla and Sánchez (2017).

To measure informational transparency, the literature mentions as a proxy the media market and political institutions, and less, alternative dimensions such as the collection and dissemination of economic data (Hollyer,

Rosendorff and Vreeland, 2014). The media market is represented by the freedom of expression (Brunetti and Weder, 2003), appreciated by the Freedom of the Press and the Freedom on the Net, calculated by Freedom House. These indices characterize the legal framework of the press, political pressures, economic factors and online restrictions that affect access to information. Other indicators of transparency are focused on the influence of the media, measured by the average daily circulation of 1.000 inhabitants by the World Bank (Adserá, Boix and Payne, 2003).

Transparency of the institutional environment is often associated with corruption, as measured by Transparency International's Corruption Perception Index (CPI) (Newell, 2008, 2016), the International Country Risk Guide on Corruption in the Political System Country Risk Guide, developed by the PRS Group (Cyan, Martinez-Vazquez and Vulovic, 2014), or the Transparency of Government Policymaking in the Global Competitiveness Report (Brandão-Marques, Gelos and Melgar, 2013).

In the economy, transparency is measured by the availability of economic information to the public, measuring the speed with which governments transmit data to the World Bank and the International Monetary Fund: Islam (2006), Williams (2009), Hollyer, Rosenforff and Raymond (2014). Empirical research on measuring the transparency of real estate markets is very limited (Newell, 2016). In empirical studies, transparency in real estate is perceived by researchers as a determinant of investment, and is usually included in an aggregate index, showing the overall state of the real estate investment environment, such as the Global Real Estate Risk Index (Chen and Hobbs, 2003), the Real Estate Potential Index (Lee, 2005) and the Global Investment Attractiveness Index (Lieser and Groh, 2011). As dimensions of transparency, authors use indicators of the legal framework, the socio-cultural and political environment, such as the Corruption Perceptions Index and the Global Real Estate Transparency Index (GRETI).

GRETI, developed in 1999 by Jones Lang LaSalle and LaSalle Investment Management, remains the most representative tool for assessing transparency in real estate markets. The indexing methodology has allowed comparability of data only since 2004. This index is calculated every two years by combining the quantitative variables collected from the market with the qualitative

ones, obtained through interviews and questionnaires, improving considerably over time (Newell, 2016). In addition, the areas of the assessed markets have been expanded, for example in 2001 the index reflects transparency in only 47 countries, in 2008 out of 81 countries, and in 2018 out of 100 countries. Transparency of real estate markets in 2018 is presented from the perspective of six sub-indices (last added in 2018), based on 186 transparency factors

grouped by thematic domains: real estate investment performance (28.5%), availability of market information (16.5%), governance of listed instruments (10%), regulatory (25%), trading (15%) and real estate sustainability (5%) (JLL 2018). According to GRETI, the degree of transparency of real estate markets is appreciated by a five-tier scale, from 1 for high transparency, to 5 for opacity, according to the characteristics in **Table no. 2**.

Table no. 2. Characteristics of the transparency of real estate markets			
Characteristics of …	**High transparency**	**Low, opaque transparency**	**Measuring indicators**
Real estate investment performance	High frequency and high information value performance indicators, regularly evaluated and specific across property types	The absence of financial reference indicators, reduced frequency of application and poor credibility of property valuations	Sub-index of performance measurement
The availability of information on the market	High quality and accessible databases that record market dynamics	Lack of statistics on current or historical markets	Sub-index of market fundamentals
Corporate Governance	Strong corporate governance, detailed and available financial statements	Poor corporate governance, undeclared and non-standardized financial statements	Sub-index of governance of listed instruments
Legislative regulations	Strict regulation, robust regulatory framework	Unstable regulatory framework, unpublished procedures and rules	Sub-index of regulatory and legal
Transaction process	A fair and consistent process for transactions, professional activities based on ethical standards and good international practice	Incorrect and inconsistent transaction process, lack of professional standards	Sub-index of the transaction process
Sustainability	Mandatory regulations on energy efficiency of buildings and conservation standards	Absence of regulations on building sustainability	Sub-index of sustainability

Source: Processed by the authors

2. Research methodology

The purpose of this research is to identify the factors that make the transparency of Europe's real estate markets conditional. Taking into account the requirements of international investors in real estate and the perspectives of transparency, documented by the literature, a number of independent variables have been selected, which characterize: the institutional environment, the macroeconomic environment, technology and innovation, the social environment and the surrounding environment, correlated positively with the transparency of the real estate market quantified by *GRETI*.

2.1. Data and variables

The analysis is based on a sample of 31 states, extracted from the 100 countries for which JLL (2018) calculated the transparency index (*GRETI*). 30 are European countries where the authors of the index assimilated the Republic of Kazakhstan on the grounds that a small portion of its territory is located in the eastern extremity of Europe. The analysis horizon is from 2003 to 2017 and data on the variables included in the study comes from the following sources: *JLL, Transparency International, World Economic Forum, Sustainable Society Foundation* and *World Bank*. **Table no. 3** describes the variables used in the research.

	Variable	Description	Possible links	Period and source
Dependent	*Real estate markets transparency (GRETI)*	- reflected by the global index of transparency, calculated by JLL; - the composite score ranges from 1 – very transparent to 5 – opaque	-	*JLL, 2003-2017 http://greti.jll.com/greti*
Institutional environment			
Independent	*Corruption (CPI)*	- quantified by the perception of corruption in the public environment; - the composite score ranges from 1 – very corrupt to - 100 – little/not corrupted	Direct	*Transparency International, 2003-2017 https://www.transparency.org/research/cpi/*
	Institutions (INST)	- the quality of public and private institutions reflected by the composite score, which ranges from 1 – poor quality to 7 – high quality	Direct	*World Economic Forum, 2007-2017* https://www.weforum.org/
	Property rights (RDP)	- the level of property rights quantified by the composite score that takes values from 1 – very poorly regulated to 7 – very well regulated	Direct	*World Economic Forum, 2007-2017* https://www.weforum.org/
	Governance (GOV)	- government accountability and efficiency, political stability, lack of violence, quality of regulation, rule of law and corruption control appreciated by the composite score ranging from 1 – very weak governance to 10 – very strong governance	Direct	*Sustainable Society Foundation – SSF, 2006-2016 http://www.ssfindex.com/ssi/*
	Transparency of Government Policies (TPG)	- reflected by the composite score of values from 1 – very little transparent to 7 – very transparent	Direct	*World Economic Forum, 2007-2017* https://www.weforum.org/
Macroeconomic environment			
Independent	*Macroeconomic environment stability (MACRO)*	- appreciated by a composite score that ranges from 1 – unstable to 7 – very stable, determined by budget surplus/deficit, population savings, inflation, government debt, country rating for external loans	Direct	*World Economic Forum, 2007-2017 https://www.weforum.org/*

Table no. 3. Description of the variables used

Variable	Description	Possible links	Period and source
Competitively (GCI)	- quantified by the global index of competitiveness according to institutions, policies and factors that determine the level of productivity of a country (WEF, 2017); - the composite score ranges from 1 – low competitiveness to 7 – high competitiveness	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
Real GDP per capita (PIB)	- economic welfare relative to the number of inhabitants (per capita PPP)	Direct	*World Bank,* 2007-2017 *https://data.worldbank.org/*
Goods market efficiency (EPB)	- measured by the composite score that characterizes competition in domestic and international markets, taking values from 1 – inefficient market to 7 – very efficient market	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
Efficiency of the labour market (EPM)	- measured by a composite score, which characterizes the efficiency and flexibility of the labour market, taking values from 1 – inefficient market to 7 – very efficient market	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
Development of financial markets (DPF)	- characterized by a composite score that expresses the degree of efficiency, reliability and confidence in financial services, by values from 1 – poorly developed markets to 7 – highly developed markets	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
Market size (DP)	- reflected by the composite score that characterizes the trade balance and which takes values from 1 – small size market to 7 – large market	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
Infrastructure (INFR)	- expressed by the composite score determined by the quality of the infrastructure for transport, electricity and telephony, with values from 1 – very low to 7 – very developed	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/

	Variable	Description	Possible links	Period and source
		Technology and innovation		
Independent	*Technology usage (TECH)*	- measured by the composite score reflecting the adoption and use of technologies in the industrial sector, with values ranging from 1 for poor use to 7 – high use	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
	Business complexity (CA)	- appreciated by the ability of companies to organize themselves in cluster networks, measured by a composite score with values from 1 – less complex to 7 – very complex	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
	Innovation (INV)	- reflected by innovation capacity and investment in research and development, a composite score with values from 1 – less innovative to 7 – very innovative	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
		Social environment		
Independent	*Higher education and training (ISFP)*	- expressed by a composite score that takes into account the consistency between labour market requirements and professional training, taking values from 1 – very low to 7 – very high	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
	Health and primary education (SEP)	- measured by the composite score that highlights the quantity and quality of health services and primary education by values from 1 – low level to 7 – high level	Direct	*World Economic Forum,* 2007-2017 https://www.weforum.org/
		Quality of the environment		
Independent	*Emissions of gases (EG)*	- represented by greenhouse gas emissions per inhabitant (metric tons per capita)	Direct	*Global Carbon Atlas,* 2003-2017 *http://www.globalcarbonatlas.org/*
	Renewable energy consumption (CER)	- quantified by the ratio between renewable energy consumption and total energy consumption (%)	Direct	*World Bank,* 2003-2015 *https://data.worldbank.org/*

Source: Processed by the authors

Table no. 4 lists the descriptive statistics of each variable for all 31 states included in the panel, compiled using the STATA *software* package.

Table no. 4. Descriptive statistics					
Variables	**No of observations**	**Media**	**Standard deviation**	**Min**	**Max**
GRETI	421	2.48	0.76	1.24	4.64
CPI	462	59.95	22.37	20	97
INST	357	4.52	0.98	2.95	6.18
RDP	330	4.82	1.14	2.51	6.61
GOV	372	6.64	1.65	2.89	8.97
TPG	330	4.44	0.88	2.54	6.18
MACRO	357	5.05	0.78	2.42	6.84
GCI	357	4.74	0.56	3.77	5.86
PIB	465	33329.65	17067.39	6201.06	97864.20
EPB	357	4.63	0.53	3.49	5.54
EPM	357	4.47	0.53	3.29	5.95
DPF	357	4.42	0.75	2.49	6.40
DP	357	4.60	0.73	3.04	6.02
INFR	357	4.92	0.98	2.56	6.65
TECH	357	4.95	0.92	2.75	6.46
CA	357	4.63	0.79	3.08	5.99
INV	357	4.09	0.91	2.67	5.82
ISFP	357	5.04	0.60	3.65	6.27
SEP	357	6.14	0.36	5.09	6.94
EG	465	8.19	3.47	3.53	26.32
CER	403	15.31	13.04	0.93	58.59

Source: Processed by authors

At Europe's level, *GRETI* shows an average level of transparency of real estate markets, equal to 2.48. In 2018, when JLL published GRETI's latest figures, 7 European countries were considered transparency leaders (UK, France, the Netherlands, Germany, Ireland, Sweden, Finland) with index values between 1.24 and 1.95. In contrast, Ukraine and Kazakhstan are characterized by low transparency real estate markets (*GRETI* values of 3.82 and 4.03) and Belarus with an opaque real estate market (GRETI values of 4.32) (JLL, 2018). The Central and Eastern Europe region has made the most progress in terms of market transparency and is gradually moving closer to Western Europe (JLL, 2018). These countries have made important changes to the trading process, meaning more fair transactions, more quality and availability for reporting, and more professionalism from real estate agents side. Improvements have also been made in the regulation of real estate markets and cross-border investments.

Institutional environment

The institutional environment favours the transparency of the information flow required for the real estate trading process. A transparent housing market is a corruption free market, where information is accessible to operate consistently and correctly on the basis of legal rules and respect for private property law (JLL, 2006; Triantafyllopoulos, 2006). At European level, according to **Table no. 4**, during the analysed period, a moderate level of corruption was found (the average *CPI* score is 59.95 against 100, which means the absence of corruption). The set of legal rules determines sustainable real estate investments (Sayce, Ellison and Parnell, 2007). Political instability may increase investment risks and diminish operational efficiency (La Porta et al., 2002), and in the case of real estate investments, the effect is much more pronounced due to the low liquidity and the long periods of time needed for the depreciation of investments. **Table no. 3** highlights values of the institutional environment indicators (*INST, RDP, GOV, TPG*) that characterize a European real estate market with slightly above average transparency. Real estate studies claim that international real estate investments are strongly influenced by the transparency of real estate

markets, institutional environment and economic development (Eichholtz, Gugler and Kok, 2011). From this perspective, all indicators of the institutional environment are expected to be directly associated with the transparency of real estate markets.

Macroeconomic environment

The most developed economies are, usually, the most transparent (JLL, 2004). The high GDP per capita (the average sample of $ 33,329.65 per capita) generates a higher demand from residents for real estate, which attracts real estate investment (He, Wang and Cheng, 2009; Rodríguez and Bustillo, 2010) and indicates the size of the market (Falkenbach, 2009). Efficient goods markets are characterized by producing the right quantities of products and services to meet demand and supply on the market. The availability, efficiency and flexibility of the workforce are determinants of the attractiveness of savings for real estate investments. The development of real estate investments also involves large amounts of capital attracted from the financial markets. Therefore, economies require complex financial markets to provide the necessary capital for private sector investors through the development of the banking sector, the regulation of stock exchanges and venture capital funds (WEF, 2017).

The liberalization of capital markets in several countries has increased the economic and political pressure to create the financial instruments needed for foreign investors (Eichholtz, Gugler and Kok, 2011). Studies show that international investors are oriented towards countries whose financial systems provide the necessary capital for low-cost real estate investment (Fereidouni and Masron, 2013). Another important factor for the development of real estate investments is the infrastructure: Lal, Norman and Featherstone (2003), Chin, Dent and Roberts (2006), Ramasamy and Yeung (2010), Renaud (2012). Infrastructure for telecommunications, for example, determines the speed of information flow, thus contributing to increased economic efficiency (WEF, 2017). These elements are defining mature markets, which, in the context of real estate, are related to the dimension of transparency (Keogh and D'Arcy, 1994). According to **Table no. 4**, the indicator

average (*MACRO, GCI, PIB, EPB, DPF, DP, INFR*) characterizing European macroeconomics highlights a favourable framework for increasing the transparency of real estate markets. Therefore, macroeconomic environment factors are also expected to correlate positively with the transparency of the real estate market.

Technology and innovation

In the real estate field, technology and innovation are considered as new dimensions of transparency. The use of technology (*TECH*), investment in research and development (INV) and business complexity (*CA*) are the variables used to characterize the technological and innovation environment, which are positively correlated with transparency. The introduction of information and communications technology into day-to-day activities and production processes has revolutionized the business models of many sectors, and at the same time has led companies to become more accountable and more transparent to *stakeholders* (PwC, 2015). Innovation in the real estate sector is driven by the introduction of new *propTech* technology platforms that provide access to and capitalize on a large volume of market data (*big data*) (JLL, 2018). Linking real estate to information technology has generated new industry perspectives: intelligent and sustainable buildings and cities; online platforms for outlets; financing projects using online resources (*crowdfunding*); digital platforms for building management (*conTech*); data analysis and research (Baum, 2017). The composite score of the variables that quantifies the degree of technology and innovation indicates a relatively high level in the European industrial sector (*TECH* equal to 4.95 vs. upper limit 7), a good *cluster* organization capacity (*CA* equal to 4.63 out of 7) and above average innovation (*INV* 4.09).

Social environment

Given the new trends in transparency, communication and consumer education are indispensable for the sustainable development of the economy with a direct impact on the community (Lützkendorf, Fan and Lorenz, 2011). Primary Education and Health Services (SEP) contribute to integrating people into society and provide the basis

for further education and skills development (Porter et al., 2008). Higher education and in-service training provide the need for highly qualified staff capable of performing complex tasks and adapting to changes that have taken place. The rapid expansion of real estate education over the past decade (ISFP of 5.04 and SEP equal to 6.14 versus maximum 7) (D'Arcy and Taltavull, 2009) further contributed to reducing transaction costs and ensuring new requirements information (D'Arcy, 2009). Many of the less transparent markets do not have a history of higher education and training in relevant areas of the real estate industry, which is why they are often oriented towards the more mature real estate professionals in the early stages of real estate market development (Newell, 2008). According to these arguments, the GRETI transparency index is expected to correlate positively with the variables of the social environment.

Environment

Transparency of the real estate sector is directly related to the sustainability of the built environment. Buildings account for one third of total energy consumption worldwide, rising as revenue increases and population urbanization (PNNL, WRI and IPEEC, 2017). JLL (2018) assesses sustainability as a dimension of transparency through green building certification, energy efficiency, carbon emissions reporting, and green lease agreements. The direct relationship between the transparency of real estate markets and environmental variables is given by progress in reporting CO_2 emissions (*EG*) and renewable energy consumption (*CER*) in order to achieve sustainability goals. The average CO_2 emissions of the analysed sample is 8.19 tons per capita, and the average value of the renewable energy consumption is 15.31% of the energy consumed.

2.2. Econometric specifications

The questions that have led us to reach the research goal are: How intense and statistically significant is the link between the transparency of real estate markets and the institutional environment, the

macroeconomic environment, technology and innovation, the social environment and the quality of the surrounding environment? Does the economic development of European countries differentiate the degree of transparency of real estate markets? How far does corruption and competitiveness affect the transparency of real estate markets in the analysed countries?

The principal components analysis (PCA), OLS, t-test are the tools with which the database was processed, organized as an unbalanced panel based on their availability for the 31 states, within 15 years. The analysed countries were divided according to the World Bank's analytical classification according to gross national income per capita in 2017, to the high income group (23) and to the group of middle and low income (8). The group is a precursor stage in studying the differences in transparency according to the level of economic development. The data contained in the sample complies with normality and heteroscedasticity. The PCA analysis was applied with respect to the *Kaiser-Meyer-Ohlin statistics* (KMO> 0.5) and the *t-Student* parameter test was applied to robust Levene (1960) and Brown and Forsythe (BF) (1974) robust statistics.

3. Results and discussions

Given that the application of the PCA is conditioned by the existence of strong correlations between variables (Pearson coefficient, |r| > 0.5), represented in **Annex no. 1**, in **Table no. 5** is summarized the correlations between the transparency of real estate markets and independent variables. This justifies retaining only strongly correlated variables (|r|> 0.5) in the PCA. The relationship between *GRETI*, as an expression of the transparency of real estate markets, and the other variables that determine it is direct, very good transparency is reflected by the low values of *GRETI* (1) and the absence of transparency (opacity) is reflected by high values (5) under the positive influence of the independent variables. The associations' directions are in line with expectations because all independent variables are directly correlated with the transparency of real estate markets.

| Table no. 5. Correlations between GRETI transparency index and the independent variables	
Total group (31 states)	
Variables	***Pearson coefficient (r)***
GRETI	1
GOV	0.8325*
CPI	0.8030*
CA	0.7958*
GCI	0.7852*
TECH	0.7755*
RDP	0.7664*
INV	0.7605*
INFR	0.7468*
ISFP	0.7380*
EPB	0.7243*
INST	0.7169*
SEP	0.7167*
PIB	0.6766*
DPF	0.6230*
TPG	0.5188*
DP	0.4659*
EPM	0.3784*
MACRO	0.2589*
CER	0.2256*
EG	0.0681
Number of correlations >0.50	15/20 (75%)
Number of significant correlations	19/20 (95%)

Source: Processed by the authors

At the level of the entire sample of the 31 countries, transparency is strongly correlated with 15 indicators and statistically significant, for a *p-value* ≤ 0.05, with 18 of the 20 variables included in the research. The high transparency of real estate markets is associated with good governance (*GOV, r = 0.83*), lack of corruption (*CPI, r = 0.80*), business complexity (*CA, r = 0.80*), high competitiveness (*GCI = 0.79*), rapid adaptation to technology (*TECH, r = 0.78*), well-regulated property rights (*RDP, r = 0.77*), innovation (*INV, r = 0.76),* infrastructure's high quality (*INFR, r = 0.75*), education (*ISFP, r = 0.74*) and also health services (*SEP, r = 0.72*), market efficiency (*EPB, r = 0.72*), effectively organized public and private institutions (*INST, r = 0.72*) and transparency in adopting and implementing public decisions (*TPG, r = 0.52*), economic development (*GDP, r = 0.68)* and the financial sector (*DFM, r = 0.62*).

According to the OLS analysis, **Figures 2 and 3** illustrate the linear relationship, for a 95% confidence interval, between the transparency of real estate markets and competitiveness (**Figure no. 2**) and between transparency and corruption (**Figure no. 3**). Reducing corruption by raising the *CPI* index contributes to improving the transparency of real estate markets reflected by lower *GRETI* index values by 0.03 (R^2 = 66.9%). The positive effect of the country's competitiveness on market transparency is much higher, resulting in a fall in the index of 1.03 (R^2 = 68%). The slopes of the least squares highlight that the more competitive the economies and the uncorrupted institutional environment, the more transparent are real estate markets. The macroeconomic environment and the governance system directly influence the functioning of real estate markets.
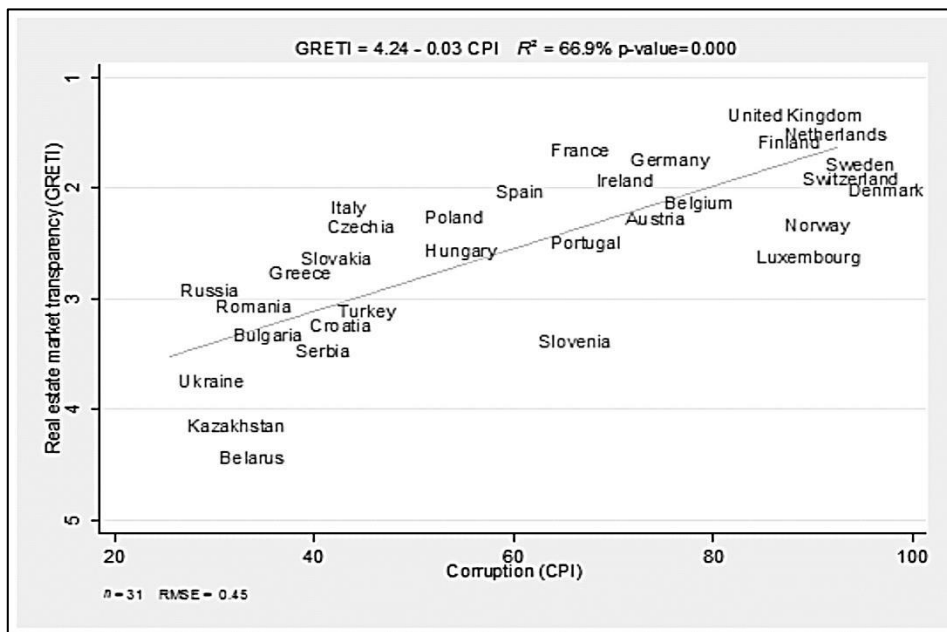
Figure no. 2. Graphic representation of the relationship between transparency and competitiveness
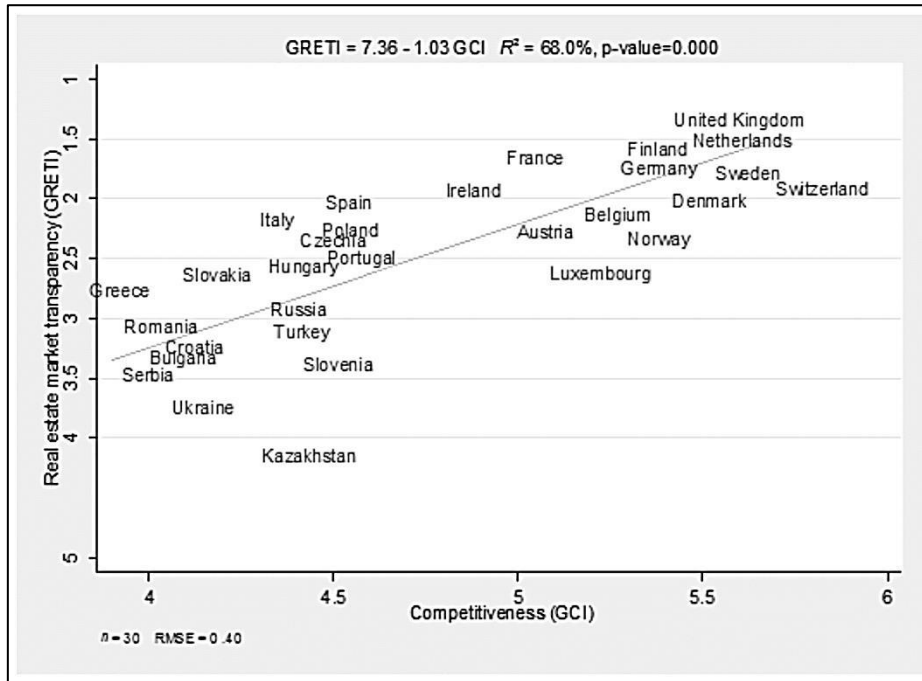
Source: Processed by the authors

Figure no. 3. Graphic representation of the relationship between transparency and corruption
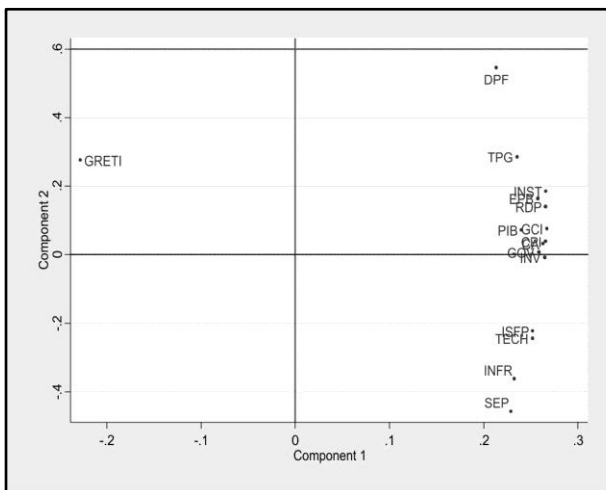

Source: Processed by the authors

The weakest links are recorded between the *GRETI* variable and the variables characterizing the market size (*DP, r = 0.47*), labour market efficiency (*EPM, r = 0.38*), macroeconomic stability (*MACRO, r = 0.26*) and the environment (*CER, r = 0.23, EG, r = 0.07*). In this respect, the authors of Sayce, Ellison and Parnell (2007) argue that real estate investors are more concerned with problems related to the social and economic dimension of sustainability than the environmental component because economic growth is needed to sustain sustainable delivery (Kauko, 2017).

For the analysis of principal components, only variables with strong statistical relationships are retained (r ≥ 0.5)

and significant (p-*value* ≤ 0.05), according to Pearson coefficients and *KMO* statistics (KMO> 0.93). According to the Kaiser and Benzécri criteria, the first factorial axle explains the largest differences between the statistical units, namely 81.7% of the total variance. All variables included in the analysis and represented in the *Component Plot* in **Figure no. 4** contribute to the formation of the first factorial axis, which allows the position of the variables to be visualized in the system of the factorial axes. Highlighting the similarities and differences between the analysed countries according to the studied variables is represented by the projection of the average coordinates of each state in the plane of the two factorial axes (**Figure no. 5**).

Figure no. 4. Variables representation in the system of the first two factorial axes

Figure no. 5. Countries' position on the first two factorial axes
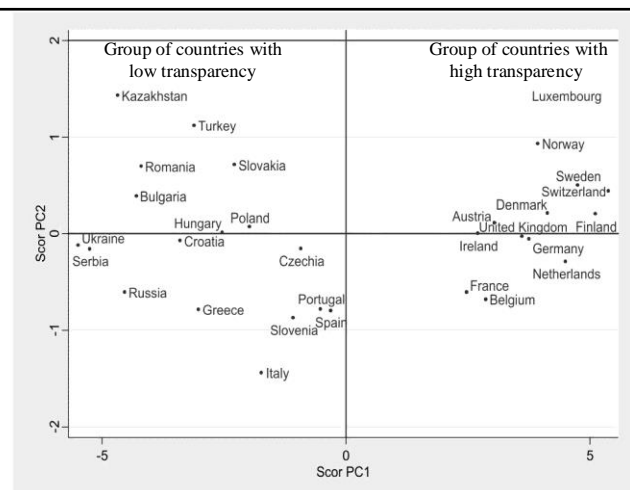
Source: Processed by the authors

Representation of the variables in the first two factorial axes highlights the direct link between the transparency of real estate markets and the variables describing institutions, macroeconomic conditions, technology and innovation and the social environment. These results accentuate the fact that countries, which record high values for the independent variables studied, are distinguished by transparent real estate markets, the *GRETI* index recording low values. Institutional environment variables (institutions - *INST*, property rights - *RDP*, corruption - *CPI* and governance - *GOV*), variables of the macroeconomic environment (market

efficiency - *EPB*, competitiveness - *GCI*, *GDP* per capita - *PIB*), technology and innovation variables (business complexity - *CA* and innovation - *INV*) are strongly correlated with the first factorial axis and explain significantly the differences between the analysed countries.

Countries' position on the first factorial axis outlines the differences between countries with transparent real estate markets and those with opaque markets, consisting mainly of two groups of states: the first group consisting of the UK, France, the Netherlands, Germany, Ireland, Sweden, Finland , Switzerland,

Belgium, Denmark, Austria, Norway and Luxembourg and the second group consisting of Kazakhstan, Ukraine, Russia, Serbia, Bulgaria, Romania, Croatia, Hungary, Turkey, Slovakia, Poland and Greece. The first group corresponds to the most developed countries in Europe, which also have the most transparent and mature real estate markets, and the second one includes less developed countries and low-priced real estate markets. Though considered countries with transparent markets, Italy, Slovenia, Spain and Portugal are positioned in the negative values quadrant. The middle positions of these states in the rankings of competitiveness and corruption explain to some extent the results.

The differentiation of the real estate market transparency according to the economic development is also evident from the results of the *t-Student* test. Following the robust Levene and BF tests to test variance equality between developed and emerging countries and developing countries, the results indicated that the standard deviations of the two groups are different, with the null hypothesis being rejected (*p-value = 0.00*), which makes it impossible to apply the classic *t-test*. The literature recommends the use of the *t-test* proposed by Welch (1947) under unequal standard deviations and samples of different sizes (Derrick, Toher and White, 2016). The results of testing the hypothesis of equal averages of the groups of states are presented in Table no. 6.

Table no. 6. Transparency differences between developed and emerging and developing countries. Welch *t-test* for equal means

Countries' group	Media	Standard error of average	Standard deviation	t	Welch freedom degrees	*p-value* bilateral	Mean difference
Developed countries	2.140	0.028	0.495				
Emerging and developing countries	3.365	0.057	0.612	-19.287	176.131	0.000	-1.224
Total	2.478	0.037	0.761				

Source: Processed by the authors

According to the JLL calculation methodology (2018), *GRETI*'s average for the developed countries of 2.14 (± 0.028) ranks the group as a transparent real estate market and the *GRETI* average of the 3.365 (± 0.057) emerging countries group includes real estate markets semi-transparent. The difference in *GRETI* averages of 1.224, according to the criterion of economic development determined by the Welch *t-test*, is significant, *t*(176.131) = -18.635, p-value = 0.000.

The high transparency of real estate markets in developed countries is strongly correlated with economic competitiveness, lack of corruption, robustness of public institutions and the regulation of private property rights. Similarly, the quality of business networks and the magnitude of their interactions determine the high level of transparency, which enhances market efficiency and creates opportunities for innovation (WEF, 2017).

As a result of the global financial crisis, a number of regulatory changes have been made in the real estate and collateral sectors over the last decade to increase the financial transparency of real estate and equity investment loans (JLL, 2018). In this respect, regulations are implemented at European Union level to harmonize the different European credit markets. However, each national lending market is conditioned by its own regulations, which do not allow the creation of a single lending market at European level (Aalbers, 2012).

The fast adoption of existing technologies to increase industry productivity, in particular information and communication technology (ICT), infrastructure quality and value-added innovation are factors that drive new trends in the transparency of real estate markets in developed economies. Baum (2017) and JLL (2018) consider that the adoption of *propTech* technology tools for greater transparency is the future of the real estate sector.

Countries with emerging and developing economies are characterized by low values of the analysed variables and reduced transparency in real estate markets, thus being in opposition to developed economies

(**Figure no. 3**). Ukraine, Kazakhstan and Belarus are the most opaque real estate markets due to high levels of corruption (*CPI*) and reduced competitiveness, according to the *GCI*. Addressing the issues of political instability and corruption, specific to these countries, is the primary need for the development of transparent real estate markets. The situation of this group of countries highlights the fact that the development of real estate markets by increasing transparency is conditioned by the quality of the governance system.

Conclusions

The purpose of this research is to conceptually and empirically approach the transparency in the real estate field by identifying the dimensions of transparency based on the analysis of the main components, the *t-Student* test and the regression analysis from 31 European majority states.

Generally, transparency permits a continuous informational flow that requires openness, communication and reaction to public dissemination. The functioning of real estate markets in a transparent environment implies a number of institutional environment factors, macroeconomic conditions, adaptation to technology and innovation, the social environment and the environment.

Research results confirm that the most competitive and robust countries have the most transparent and mature real estate markets. In developed countries, the transparency of real estate markets rises to a higher level, outlining new trends in transparency. Technology, innovation, infrastructure and business expansion at international level are among the most important factors that strongly and statistically correlated with the high

level of transparency in real estate markets. In the case of emerging and developing countries, the quality of the governance system and the lack of corruption must be initially ensured in order to create a transparent environment for the development of real estate markets. The high quality of the institutional environment reduces transaction costs and the weak one reduces competitiveness (WEF, 2017).

At European level, the transparency of real estate markets has improved considerably, and has continued to be the most transparent region. Transparency has improved not only under the legislative constraints, but also by increasing the visibility of states, in particular developing and outside the European Union countries, which have been included in researches by world organizations concerned with economic, political and social development.

The importance of the research lies in the addition of knowledge to the issue of transparency of the real estate sector, which is constantly developing through complex, internationalized investment structures and bearing inherent risks. This study is of interest to all stakeholders in the real estate field, from state institutions to investors, because transparency determines the efficient functioning of real estate markets, where the "invisible hand" of the state and investors directly relate and determines the level of demand and supply on the market.

The limits of the research consist in the fact that the empirical analysis does not imply a case-effect analysis, providing only general directions about the factors that influence the transparent functioning of real estate markets. Research into causality remains a future direction of research.

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Annex 1. Matrix correlations

	GRETI	CPI	INST	RDP	GOV	TPG	MACRO	GCI	PIB	EPB	EPM	DPF	DP	INFR	TECH	CA	INV	ISFP	SEP	EG	CER
GRETI	1																				
CPI	0.8030*	1																			
INST	0.7169*	0.9470*	1																		
RDP	0.7664*	0.9369*	0.9699*	1																	
GOV	0.8325*	0.9556*	0.9014*	0.9272*	1																
TPG	0.5188*	0.8112*	0.9056*	0.8538*	0.7510*	1															
MACRO	0.2589*	0.5167*	0.5519*	0.4790*	0.4628*	0.5684*	1														
GCI	0.7852*	0.9115*	0.9405*	0.9203*	0.8604*	0.8462*	0.5920*	1													
PIB	0.6766*	0.7803*	0.7943*	0.7981*	0.7718*	0.7312*	0.5739*	0.7270*	1												
EPB	0.7243*	0.8970*	0.9199*	0.9253*	0.8754*	0.8234*	0.5426*	0.9118*	0.7978*	1											
EPM	0.3784*	0.5844*	0.6779*	0.6115*	0.5305*	0.7024*	0.5775*	0.7120*	0.5238*	0.6460*	1										
DPF	0.6230*	0.7867*	0.8008*	0.7926*	0.7806*	0.7040*	0.6462*	0.7802*	0.6347*	0.7747*	0.5994*	1									
DP	0.4659*	0.0393	0.0639	0.1147*	-0.0089	-0.0273	-0.1048*	0.2664*	0.0854	0.0805	0.0392	0.041	1								
INFR	0.7468*	0.7841*	0.7709*	0.7919*	0.7529*	0.6778*	0.2717*	0.8254*	0.6379*	0.7401*	0.4047*	0.4933*	0.3328*	1							
TECH	0.7755*	0.8726*	0.8278*	0.8419*	0.8562*	0.7403*	0.4285*	0.8605*	0.7485*	0.8204*	0.5489*	0.5663*	0.0848	0.8335*	1						
CA	0.7958*	0.8965*	0.9044*	0.9303*	0.8798*	0.7757*	0.4787*	0.9473*	0.7203*	0.9040*	0.5815*	0.7485*	0.3015*	0.8222*	0.8045*	1					
INV	0.7605*	0.9017*	0.9252*	0.9101*	0.8568*	0.8353*	0.5116*	0.9686*	0.7023*	0.8710*	0.6678*	0.7133*	0.1992	0.8209*	0.8470*	0.9349*	1				
ISFP	0.7380*	0.8294*	0.8220*	0.7988*	0.7965*	0.7156*	0.3995*	0.8795*	0.5468*	0.7759*	0.5869*	0.5627*	0.2095*	0.7800*	0.8126*	0.8355*	0.8932*	1			
SEP	0.7167*	0.7673*	0.7134*	0.7344*	0.7856*	0.6008*	0.2458*	0.7397*	0.5550*	0.6870*	0.3919*	0.4770*	0.1169*	0.7157*	0.7476*	0.7503*	0.7699*	0.8495*	1		
EG	0.0681	0.2146*	0.2926*	0.2406*	0.1943*	0.3134*	0.3664*	0.2201*	0.5561*	0.3338*	0.2854*	0.2650*	0.1277*	0.1430*	0.1369*	0.1834*	0.1685*	0.0709	0.0656	1	
CER	0.2256*	0.4030*	0.3622*	0.3082*	0.3991*	0.3294*	0.3124*	0.2898*	0.2408*	0.1650*	0.1129	0.2648*	0.2402*	0.1924*	0.3758*	0.2467*	0.3364*	0.3722*	0.3184*	-0.3071*	1

Source: Processed by the authors