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FULL ARTICLE

An exploratory analysis of the interactions between the determinants of migratory flows

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Abstract

More than often, studies explaining migration causes centre on economic explanations and minimize other factors' explanatory power. This research aims at creating a comprehensive model of migration determinants taking into account four dimensions: economic, social, cultural, and digital. A path model consisting of these dimensions was created and estimated through partial least squares structural equation modelling (PLS-SEM). The PLS-path model was applied to Romanian migration flows to 21 EU member states during 2007–2017. The findings indicate that social and technological developments have significant impacts on migration flows and that digital distance has a full mediation effect on the relationship between cultural distance and migration flows.

KEYWORDS
digital performance, Europe, migration determinants, partial least squares structural equation modelling, societal development

JEL CLASSIFICATION
C39, O15, O52

1 | INTRODUCTION

The research on the relationship between immigration and development has gained much attention in development research due to significant policy implications. One specific aspect, which explains the elements and aspects that determine people to migrate, has gained even more attention. Indeed, the decision to migrate is complex, involving

cost–benefit analyses between origin and destination regions. Depending on migration type, internal or external migration, these analyses are influenced differently by economic, social, cultural, and political factors. More than often, studies on this matter are centred usually on the explanatory power of socio-economic pull factors from the destination countries, minimizing other elements' explanatory power. In this context, this research aims to create a comprehensive model of migration determinants taking into account the following dimensions: economic, social, cultural and digital. This research has two objectives: first, to analyse the direct effects of these four dimensions on migration flows, and second, to analyse the mediating role of the following constructs: economic, social and digital distances on migration flows.

Based on previous research, five constructs were created, four of them encompassing a specific set of determining factors and one encompassing several migration flows. The first construct is economic distance or dimension, which reflects the distance between countries in economic terms; in other words, it looks at the classical economic determinants of migration decisions. The second construct is social distance or dimension, and it defines the differences in the level of societal development between countries. It is reflected in the elements developed within the social progress index. More specifically, it includes the satisfaction of basic human needs, foundations of well-being and opportunity.

The third construct is cultural distance or dimension, and it defines the differences in the national culture. In this regard, this construct consists of two of the cultural dimensions developed by Hofstede (Hofstede Insights, 2020), power distance index and uncertainty avoidance index. The fourth construct refers to technological/digital advancement and expresses the differences in digital performance between countries. In this regard, the construct reflects the discrepancies between states in five areas: connectivity, digital skills, internet services used by citizens, integration of digital technology by businesses and digitization of public services. Finally, the fifth construct consists of Romanian outflows to 21 EU member states for each year of between 2007 and 2017.

A path-model was created and estimated through partial least squares structural equation modelling (PLS-SEM) based on these five constructs. The PLS-path model was applied to Romanian migration flows to 21 EU member states during the period 2007–2017. This research's originality stands in its conceptual framework and its methodology, being the first study examining the effect of digital advancement on migration decisions and the first study that integrates four dimensions, considered critical drivers of migration, into a path model estimated through PLS-SEM. The novelty of this model is represented by adding the component of technological/digital distance to the analysis of migration drivers.

In a context of rapid digitalization, studying the technological advancements of the EU member states has important policy implications on a range of issues spanning from education and labour market to inequality. Strategic investments in basic and advanced digital skills, in broadband coverage and digital public services are a few of the steps that prepare Europe for the digital age. Whereas the COVID-19 pandemic has intensified the demand for digitalization, it may pose new challenges to the already existing problems within EU member states that may disrupt the course of digitalization. Also, a better understanding of the impact of technology on labour market outcomes is required, since technical changes modify the task or/and the skill distribution of labour by replacing the set of tasks that are routine or codifiable (which are performed primarily by medium skill workers). As Acemoglu and Autor (2011, p. 1158) said when studying the implications of technologies on employment and earning, "technical change favoring one type of worker can reduce the real wages of another group" and this disequilibrium in the skill distribution can lead to polarized labour markets, which in turn generate increased inequality. Now this concern becomes even more problematic when applied to the other EU countries (the developing countries) and comes with even bigger consequences for the EU as a whole.

The paper is structured in seven parts. The first sections are the introduction, the literature review and the description of the conceptual framework. Section 4 presents the method, the description of the variables and the study area. Section 5 is dedicated to evaluating the PLS-SEM results, including the assessment of the reflective measurement model and the evaluation of the structural model. Section 6 presents the results of the mediation analysis. The paper ends with the concluding remarks and the limitations of this research.

2 | LITERATURE REVIEW

The literature about the determinants of migration is considerable, and, given the objective of this paper, it will be grouped into two sections; more specifically, the first part of the literature review will be focused on the socio-economic determinants of migration and the second one on the cultural and digital impacts on migration. Before starting, it is important to mention that researchers analysed mainly the socio-economic drivers of migration, undermining the impact of other factors. Having this in mind, we will proceed by describing the theoretical and the practical developments made until now in the literature.

2.1 | Socio-economic drivers of migration

The classical determinants of migration are intensively studied within the economic approach of migration decisions. The economic approach uses the theory of human capital, and its rationale is that individuals consider migration as an investment if it implies a better return on their human capital. Within this approach, the most encountered economic models are the human capital model (Sjaastad, 1962), expected income model (Todaro, 1969), risk propensity and risk aversion model (Stark & Bloom, 1985), utility of consumption model (Dustmann, 1995). These studies focus on comparisons between origin and destination regions about GDP, expected income, job-finding probability, regions' wealth, employment rate, income distribution. The results of these studies demonstrate a positive relationship between migration and economic drivers; in other words, the higher the wealth differentials between origin and destination regions, the higher the propensity to migrate.

Other determinants of migration go "beyond GDP," in other words, migration also rises from social factors by comparing the differences in income distribution, types of inequality, general well-being, etc. Studies that explain migration taking into account social factors are Collier (2015), Park (2015), Brunetta et al. (2004), Smith and Floro (2020). These studies suggest that the propensity to migrate is higher when the dissatisfaction with the social conditions (including the provision of basic human needs: nutrition, water, shelter and sanitation, etc.) from the origin areas is increasing. In addition, the institutional framework from the origin/destination countries may create push/pull factors of migration. In this regard, Arif's (2019) research is the first study that analysed the influence of economic, political and social institutions on international migration for 103 countries over 1990–2000. Their results indicate that economic freedom has the most substantial pull effect and that economic and social institutions are the most important push factors of migration.

To quantify the differences in social aspects between countries, studies such as Jitmaneeroj (2017) and Syrovátka and Schlossarek (2019), have compared the utility of several social indexes. Moreover, many studies analyses the relationship between indexes of social development and economic indicators (Asandului et al., 2016; Bren et al., 2019). For example, Bren et al. (2019) examined the economic impact on social development (expressed by the social progress index), homeland security (represented by global peace index) and global democracy (expressed by democracy index). Among other objectives, Bren et al.'s study aimed at finding correlations between these indexes and economic indicators. The results demonstrated that social development, expressed by the social progress index, is correlated positively with economic indicators as gross domestic product and *per capita* gross national income. In other words, the higher the economic performance of a state, the higher its social development.

2.2 | Cultural and digital impact on migration

The second part of the literature review is centred on the relationships between culture, technology and migration. Examples of studies analysing the impact of culture on migration are White and Buehler (2018), Adserà (2015), Aleksynska (2011), Geis et al. (2013), Nejad and Young (2016), and Migali (2018). For instance, White and

Buehler (2018) examined the impact of three cultural distance measures (Inglehart measure, Hofstede measure and the GLOBE cultural distance) on international migration flows. A valuable input of their research is the decomposition of the cultural distance into their component dimensions to examine how the individual dimensions vary in explaining migration. Their results indicate that dimensions associated with individualism, uncertainty avoidance and perceived gender roles are more influential in determining immigrant flows than other cultural dimensions. In general, previous studies use gravity models to explain the determinants of migration decisions and they all confirmed the existence of a negative relationship between cultural distance and immigration flows.

The gravitational approach of migration derives from regional economics and, within this approach, migration movement is based on ideas from physical science, more specifically is explained through the forces that attract one region to another. This law of spatial interaction resembles Newton's law of gravity and Ravenstein (1885) introduced this approach, through which mobility is the result of attraction forces between the populations of two regions, plus the distance between them. The approach uses aggregated measures and is based on the following assumptions: the higher the population in two regions (*i* and *j*), the higher the number of persons who migrate from *i* to *j*. Second, the number of migrants will decrease by the distance between *i* and *j* and will increase by pull factors in *j* or push factors in *i*. A general representation of the model is presented below:

$$M_{ij} = P_i P_j B_i A_j (D_{ij}),$$

where M_{ij} is the net flow of migrants from *i* to *j*, P_i is the population in region *i*, P_j is the population in region *j*, B_i are the push factors from region *i*, A_j are the pull factors from region *j* and D_{ij} is the distance between region *i* and *j*.

The modern literature on gravity models of migration can be divided into three branches, according to how migration flows are modelled and how the concept of culture is explained: the old Newtonian gravity models are accounting for cultural elements that model bilateral migration flows (Adsera & Pytlikova, 2012; Belot & Ederveen, 2012; Ginsburgh & Weber, 2016). There are Einsteinian gravity models that use cultural relativity and model one-directional flows of migrants (Anyanwu, 1992; Flowerdew & Amrhein, 1989; Thorn et al., 2013; Tubadji & Nijkamp, 2015a) and there are models which account for the cultural component statically (Li et al., 2018; Tung & Verbeke, 2010). Given that the approach developed in this analysis models one-directional flow of migrants, it will be included in the second category of the Einsteinian gravity models.

The influence of culture on migration can be studied, taking into account, the indirect effects of culture on societal development. In this regard, studies (Krys et al., 2020; Oreg & Sverdlik, 2018; Skvarciany & Tereštšenkov, 2016) have shown the significant impact that culture has on social progress. For instance, Dan's (2017) study aimed at identifying links between cultural dimensions defined by Hofstede and Schwartz and social progress defined as social progress index. Their results suggested that cultural characteristics, like Hofstede's indulgence and Schwartz's embeddedness and egalitarianism, have a considerable impact on the social development process.

Regarding the influence of digital advancement on migration, there are many studies, including Chouliaraki and Georgiou (2019), Kotyrlo (2019), Nedelcu (2012), and Rodima-Taylor and Grimes (2019), Moon et al. (2010), indicating mixed results, a positive/negative relationship between changes in ICT development and migration intensity. On one hand, the analyses on this topic emphasize how ICT mechanisms may increase migration flows by creating connected lifestyles, enhancing the capacity to harness otherness and facilitating socialization. On the other hand, it explores the use of digital technologies by migrants, institutions and civil society actors in the processes of empowerment, surveillance and migration control.

Lastly, there are numerous studies concerned with the impact of digital/technological development on economic development. For instance, it is argued that performances in the digital area create new economic opportunities, especially by creating new jobs, by developing high-performing ICT infrastructure and implementing new generation networks (Russo, 2020). Furthermore, within this area, other studies analysed not only how digital transformation affects sustainable development (Stavytskyy et al., 2019), de la Hoz-Rosales et al., 2019), but also, how digital transformation is affected by national culture (Jovanović et al., 2018). In this regard, Jovanović et al. (2018) examined the

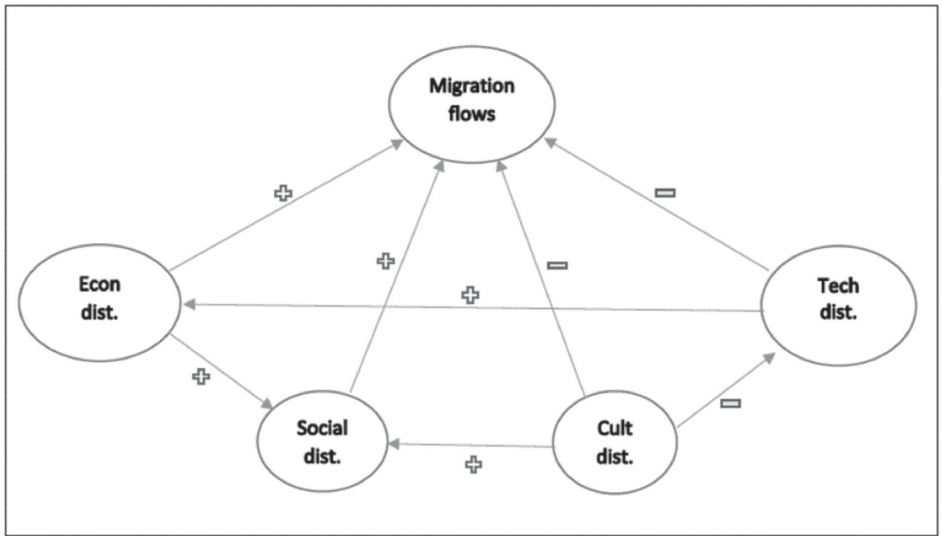
correlations between the digital economy and society index (DESI) and economic indicators (GDP, global competitiveness index, the good country index, etc.) and the correlations between DESI index and Hofstede cultural dimensions. Their results demonstrate positive correlations between digital development and economic indicators, and negative correlations between cultural dimensions (power distance index (PDI) and uncertainty avoidance (UAI)) and digital development. On the same research line, studies as Coccia (2014), Zhao (2011), Khalil (2011), and Al Hujran et al. (2011), found positive/negative correlations between national culture and digital development, depending on the cultural dimension taken into consideration. In addition, some studies point out the existence of a strong relationship between a nation's culture and its level of innovation (Ambos & Schlegelmilch, 2008; Rhyne, Teagarden, & Van den Panhuyzen, 2002; Rubino et al., 2020; Steensma et al., 2000) and the level of ICT development (Bagchi et al., 2003; Clifton et al., 2014).

3 | CONCEPTUAL FRAMEWORK

Due to its capacity to model complex phenomena between exogenous and endogenous variables, a SEM approach has been adopted. Drawing upon the results of the studies presented in the previous section, a conceptual framework was created that analyses the determinants of migration flows, taking into account four dimensions: economic, social, cultural and digital. Each dimension is calculated as the difference in values for each dimensions' specific indicators; in other words, each dimension can be considered as a type of distance between countries that ultimately affects migration decisions. Therefore, the term "dimension" and "distance" can be interchangeable in this context. Furthermore, given the implications of the digital dimension on this paper's subject, the term technological distance is interchangeable with the one of digital distance.

As indicated in Figure 1, the conceptual framework of this study is focused on:

- the direct effects of each dimension on migration and its indirect effects; and
- the mediating role of three dimensions: economic, social and digital on migration flows.



Source: Authors' own elaboration.

FIGURE 1 Theoretical assumptions for the direct and indirect effects of the path model

Four types of direct effects on migration flows are tested: economic distance, social distance, cultural distance and digital distance. The first hypothesis is that economic distance has a positive effect on migration flows; put differently, the higher the distance regarding the economic development between countries, the higher the propensity to migrate. The second testable hypothesis is the existence of a positive effect of the social distance on migration; meaning that the higher the differences in social progress, the higher the intensity of migration. The third one is the existence of a negative effect of cultural distance on migration, indicating that the higher the cultural distance between countries, the lower is the propensity to migrate. The last testable hypothesis supposes a negative effect between technological/digital distance and migration flows, meaning that higher digital distance between countries lowers migration flows.

The second set of testable hypotheses refers to the indirect effects of some of these dimensions on migration flows. In this way, the direct and indirect effects are compared. It can be seen how the direct effect of one dimension on migration changes when another dimension is taken into account. In this regard, the following relationships are hypothesized: the existence of positive indirect effects of economic distance, cultural distance and digital distance on migration flows. For example, even if a high cultural distance between countries may have a negative effect on migration when taking into account differences in social development, it may have a positive effect favouring migration. Lastly, based on the literature review, there were hypothesized the following mediation roles:

- the mediator role of social distance on the relationship between economic distance and migration flows;
- the mediator role of social distance on the relationship between cultural distance and migration flows;
- the mediator role of digital distance on the relationship between cultural distance and migration flows;and
- the mediator role of economic distance on the relationship between digital distance and migration flows.

In this view, the conceptual framework put forward in this research creates a comprehensive way of analysing migration decisions, taking into account more than one or two possible determinants.

4 | METHOD, STUDY AREA AND VARIABLES

This section presents the method used to estimate the path model, the variables and its indicators and the study area the model was applied to.

4.1 | Method

Although regression analysis is the most used technique in migration studies, in the last decade, scholars have begun applying the method of structural equation modelling (SEM). For example, SEM was used in analysing the impact of environmental factors on migration (De Longueville et al., 2019), the effect of well-being on asylum migration (Paniagua et al., 2020), the effect of income on international migration (Ortegay & Peri, 2013), the effect of immigration policy on immigration flows to Canary Islands (Hernandez Aleman & Leon, 2012) and the cultural impact on student migration in Europe (Baláž, 2010).

Furthermore, some studies employed partial least square path modelling (PLS-PM) to model the concept of culture-based development (CBD). For instance, Tubadji and Pelzel (2015) used PLS-PM to explore the relationship between culture and the sub-components of socio-economic development on data for Germany in 2006 and Tubadji and Nijkamp (2015b) employ the same approach to operationalize the CBD hypothesis for the existence of a cumulative causation process of cultural impact on Greek local development. Whereas these CBD models apply the PLS-PM to model local productivity, the model proposed in this paper models instead migration flows but with a PLS-SEM approach, thus building, recombining and extending the existing literature on the matter.

SEM is a powerful statistical technique that can identify complex social science relationships by combining factor analysis and multiple regression analysis. The advantages of using SEM over multiple regression analysis stand in its explicit assessment of measurement errors (which in multiple regression analysis are ignored) and in its capacity to test simultaneous relationships, having the ability to test a full structural model, not only a model containing a single dependent variable as in a multiple regression analysis. Another advantage of using SEM is the ability to link micro (individual-specific differences) and macro perspectives (aggregated indicators) and its considerable potential for theory development through model re-specification (Nunkoo & Ramkissoon, 2011).

SEM is used to either confirm or explore theory; in this regard, there are two types of SEM: covariance-based (CB-SEM) which is used to confirm or reject theories and, a second type, variance-based structural equation modelling (PLS-SEM), which is primarily used for exploratory research. Having in mind the rules of thumb for choosing between PLS-SEM and CB-SEM developed by Hair et al. (2017), the present research is using PLS-SEM for the following reasons: its goals are to identify key "driver" constructs of migration and to contribute to the development of the existing theories. Second, the structural model is complex (it has many indicators), the sample size is small (22 countries) and the data follow a non-normal distribution. Among the key characteristics of PLS-SEM, the following properties are encountered:

- generally, it achieves high levels of statistical power with small sample sizes;
- it makes no distributional assumptions;
- works with metric data, ordinal scaled data, and binary coded variables (with certain restrictions);
- handles complex models with many structural model relations; and
- maximizes the R^2 values and the construct scores are used for predictive purposes and as input for subsequent analyses.

Applying SEM means creating a path model, a diagram used to visually display the hypotheses and variable relationships that are examined when structural equation modelling is applied. A path model has two elements: the structural model that describes the relationships between the latent variables (this element was presented in Section 3), and the measurement model which describes the relationships between latent variables and their indicators. Regarding the latter one, there are two types of measurement modes: reflective and formative measurement models. Given the constructs' conceptualization and the study's aim, this research model uses Mode A (reflective measurement model). Furthermore, the decision of choosing Mode A rests on the following arguments:

- the causal priority is from the construct to the indicators (Diamantopoulos & Winklhofer, 2018);
- the construct is a trait explaining the indicators (Fornell & Bookstein, 1982);
- the indicators represent the consequences of the construct (Rossiter, 2002); and
- the items are mutually interchangeable (Jarvis, MacKenzie, & Podsakoff, 2003).

The last guideline in the case of the construct of cultural distance is partially accomplished given that the two cultural dimensions (PDI and UAI) are not interchangeable. Whereas we tried to create a single-item construct based on a composite measure of cultural distance, that construct lacked sufficient reliability. Therefore, we opted for creating the construct of cultural distance with these two indicators.

The complexity of studying migration may be eased by applying mediation analysis, in other words, mediation helps explain why a relationship between an exogenous and an endogenous construct exists. For instance, mediation may explain why the negative direct effect of increased digital distance between two countries on migration may be counteracted by the positive indirect effect of its corresponding economic and cultural distances. In fact, studies such as Urzua et al. (2019), Yang and Yang (2020), and Grigoryev (2016), employed mediation analysis to grasp migration issues.

4.2 | Study area and variables

The path model developed in this research has four exogenous latent variables: economic distance, social distance, cultural distance and technological distance, and one endogenous latent variable: migration flows. The endogenous variable consists of 11 indicators formed by Romanian outflows to 21 EU member states for each year over the period 2007–2017. The emigration data was retrieved from the OECD International Migration Database.

Four indicators form the first exogenous construct: the index of economic freedom, gross domestic product *per capita*, minimum wage and total public expenditure. The data for the index of economic freedom was retrieved from the website of The Heritage Foundation and the other three variables used for creating the construct of economic distance were retrieved from the Eurostat database. The index of economic freedom, created by The Heritage Foundation and *The Wall Street Journal*, measures the degree of economic freedom in the world's nations and is based on 12 quantitative and qualitative factors, grouped into four pillars: rule of law, government size, regulatory efficiency and open markets. The index of economic freedom was computed as the average of the difference between the values specific for Romania and the values of the destination countries. Given that there were no significant variations in time, the *per capita* GDP, the minimum wage and the total public expenditure (expressed in natural logarithm) were calculated as the difference in the average values between Romania and the destination countries.

The construct of social distance consists of the social progress index for each year over the period 2014–2019. The Social Progress Imperative (2020), a non-profit organization, created this index and it measures the extent to which states provide for the social and environmental needs of their citizens. This index shows the relative performance of nations in three areas: basic human needs (medical care, water, shelter, and personal safety), foundations of well-being (access to basic knowledge, information and communication, health and wellness, environment quality) and opportunity (individual rights, personal freedom and choice, inclusiveness and access to advanced education). Each social progress index was computed as the difference between the values of the destination country and the values for Romania.

The construct of cultural distance is based on two of Hofstede's cultural dimensions theory (Hofstede et al., 2010): power distance index (PDI) and uncertainty avoidance (UAI). The former expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. In contrast, the latter describes the extent to which the members of a culture feel threatened by ambiguous or unknown situations. As suggested by Hair et al. (2017), to be reliable, the indicators' outer loadings should be higher than 0.70 and the values with outer loadings between 0.40 and 0.70 should be removed if their deletion leads to an increase in composite reliability and average variance extracted (AVE). Given that the other four dimensions of the Hofstede cultural model (IDV—individualism versus collectivism; MAS—masculinity versus femininity; LTO—long-term orientations versus short-term orientations and IVR—indulgence versus restraint) did not meet the threshold of 0.70 and did not improve either the composite reliability, or AVE, they have been excluded. Excluding those indicators means admitting its potential impact on content validity. Both indicators, power distance index (PDI) and uncertainty avoidance (UAI), were calculated as the difference of the values between the destination countries and the origin one.

The last exogenous variable was created using the digital economy and society index (DESI) for 2014–2019. The digital economy and society index is a composite index that outlines indicators of Europe's digital performance, and EU' member states competitiveness. DESI index comprises five dimensions connectivity (related to fixed and mobile broadband coverage), human capital (internet user skills and advanced skills and development), use of internet services (internet use, activities online and transactions), integration of digital technology (business digitization and e-commerce) and digital public services (indicators related to e-Government). Each DESI index was computed as the difference of the values between the destination countries and the origin country. A table with summary statistics for all the indicators that formed the endogenous and exogenous constructs is provided below.

An observation has to be made about several indexes, such as SPI and DESI, which were available after 2014. Still, given that the differences in these indicators do not exhibit considerable variation in time, it has no significant impact on the construction of these constructs. A list of each constructs' indicators, including the databases' sources, is presented in Table 2.

The study area is centred on the outflows from Romania to the following countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden for the period 2007–2017. Due to data unavailability, there were only 21 countries and, the research is focusing on Romania due to its significant outflows in the last years and its consequences on the Romanian economy. For instance, in a World Bank report (2018) it was argued that, between 1990 and 2017, Romania registered the highest increase in the migration stock, at 287%. This large outflow affected especially the Romanian working population (both high skilled and low skilled), given that the working-age emigrants exceed 2.65 million persons, and lead to significant labour supply shortages. Furthermore, the same report analysed the socio-economic consequences of emigration, claiming that the positive impact of remittances and return migration on economic growth was partially offset by the negative impact of skilled emigration. The increased investments and labour productivity were set off by the slow real GDP growth. Also, the social impact of emigration has mixed results. On the one hand, remittances reduced poverty and inequality within regions and between rural and urban areas. On the other hand, Romanian emigration had adverse effects on family structures, leading to marginalization, exclusion and lower participation rate in the education of children with both parents working abroad.

Second, a better understanding of migration drivers can provide us with grounds for policy solutions to offset the negative consequences of migration in the origin countries. Whereas the results of this study may seem to offer policy insights primarily applicable to the Romanian case, its implications for other countries cannot be ruled out. For instance, the policy recommendations made in the conclusions, which are essentially stressing the need to make more investments in digitalization and societal development in the origin country can be seen as a lesson for the future countries which are in the process of joining the EU or aspire to EU accession which may face similar outflows and constraints on their economies.

5 | PLS-SEM RESULTS AND INTERPRETATION

The PLS path model developed in this study is estimated with SmartPLS software (SmartPLS, 2020). The next sections focus on a systematic evaluation of PLS-SEM results involving two steps: the assessment of the reflective measurement model and the evaluation of the structural model.

5.1 | Evaluation of the reflective measurement model

The evaluation of the reflective measurement model supposes analyses of reliability and validity (Hair et al., 2019). The reliability analysis provides information about the reliability based on the intercorrelations of the observed indicators' variables and is formed by:

- Indicator reliability is measured by the indicator's outer loadings, which should be higher than 0.70. The indicators "Outflows_2007" and "Econ_iee", although having values lower than 0.7 (0.687 and, respectively 0.640), have been kept given their significant impact on the construction of the variables.
- Internal consistency reliability is measured by composite reliability (in exploratory research, 0.60 to 0.70 are considered acceptable) and Cronbach's alpha.

The validity analysis includes:

- Convergent validity is the extent to which a measure correlates positively with alternative measures of the same construct. A common measure to establish convergent validity is AVE and an AVE value of 0.50 or higher indicates that, on average, the construct explains more than half of the variance of its indicators.

- Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards and is measured by cross-loadings analysis, Fornell-Larcker criterion analysis or HTMT (heterotrait-monotrait ratio of the correlations) criterion. The discriminant validity for this model is tested using the HTMT criterion by running complete bootstrapping with bias-corrected and accelerated bootstrap confidence intervals.

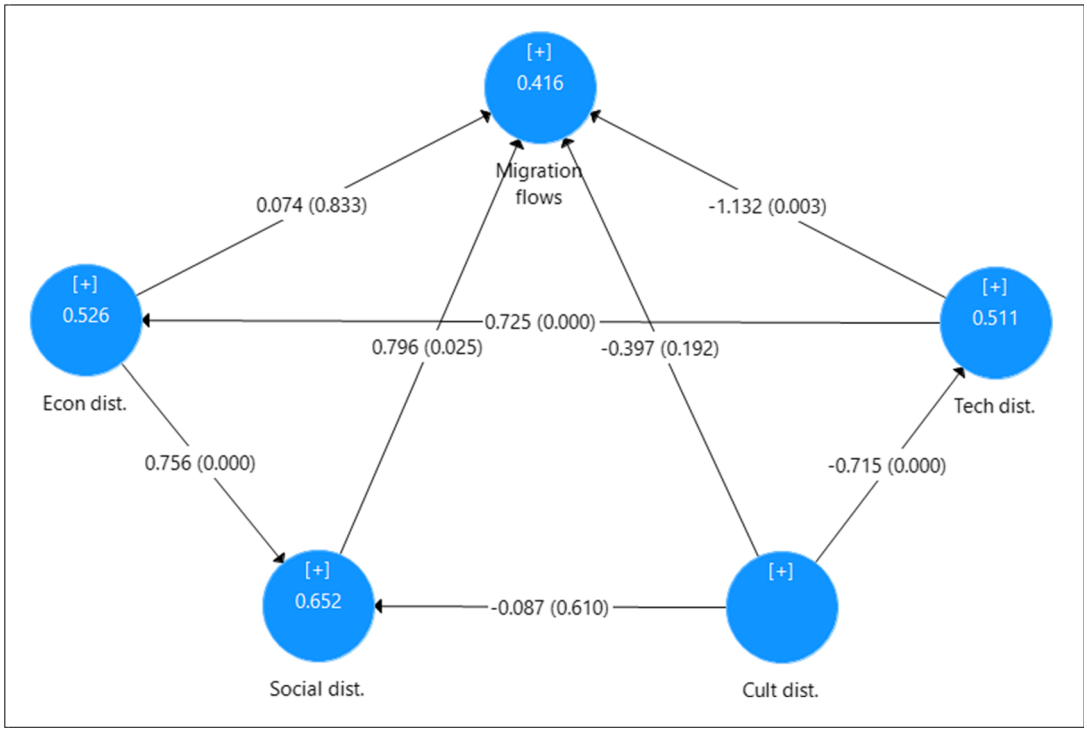
Tables 3 and 4 present the results of the reflective measurement model assessment. As can be observed, all model evaluation criteria have been met, providing support for the measures' reliability and validity.

5.2 | Evaluation of the structural model

The criteria for assessing the structural model are the inner variance inflation factor (VIF) values, the statistical significance of the path coefficients, the level of the coefficient of determination (R^2), the f^2 effect size, the predictive relevance Q^2 and the q^2 effect size.

To assess collinearity, each construct has been examined through the inner VIF values. As shown in Table 5, all the constructs have values close to three and lower, indicating no collinearity issues.

Figure 2 presents the statistical significance of the path coefficients, obtained by 500 bootstrapping subsamples with a 5% significance level. The analysis of the direct effects of the four distances on migration flows



Source: SmartPLS software.

FIGURE 2 PLS-SEM Path Coefficients Results

Note: Within the circles are indicated the coefficients of determination (R2) and on the arrows the direct effects with the corresponding p-values

confirms the relationships hypothesized in the section with the conceptual framework. More specifically, the results indicate:

1. A positive effect (0.074) of economic distance on migration flows; put differently, the higher the distance regarding the economic development between countries, the higher the migration flows.
2. A positive significant effect (0.796) of social distance on migration flows; meaning that, the higher the differences in social progress between countries, the higher the intensity of migration.
3. A negative effect (−0.397) of cultural distance on migration flows, indicating that the higher the cultural distance between countries, the lower are the migration flows.
4. A negative significant effect (−1.132) of digital distance on migration flows, meaning that increased digital distance between countries lowers migration flows.

The third criterion for assessing the structural model is the level of the coefficient of determination (R^2). The R^2 value of the structural model is 0.416, indicating that 42% of the variance of migration flows can be explained by this model. The effect size f^2 allows assessing an exogenous construct's contribution to an endogenous latent variable's R^2 value. In this regard, f^2 effect sizes of several distances on R^2 have been assessed. Applying the formula developed by Hair et al. (2017), the f^2 effect sizes of economic, social, cultural and digital distance on migration flows' R^2 are 0.001, 0.351, 0.126 and 0.618, suggesting that digital and social distance have the largest impact on migration flows, followed by cultural distance (which has a medium effect) and economic distance (small effect).

To test the predictive relevance, the Q^2 value was computed by blindfolding procedure (setting at six the omission distance). The resulting Q^2 value is 0.28, demonstrating that the exogenous constructs, the economic, social, cultural and digital distances, have predictive relevance for the endogenous construct: migration flows. The Q^2 value represents a measure of how well the path model can predict originally observed values and the relative impact of predictive relevance can be compared by measuring q^2 effect size. Using the formula stated by Hair et al. (2017), q^2 effect sizes of economic, social, cultural and digital distances on migration flows' Q^2 values are −0.001, 0.20, 0.08 and 0.38. Having in mind that q^2 values of 0.02, 0.15, and 0.35 indicate that an exogenous construct has a small, medium, or large predictive relevance, it can be argued that digital distance has a large predictive relevance for migration flows, social distance has a medium-large predictive relevance, cultural distance has a small-medium predictive relevance, and economic distance has no predictive relevance.

The above analysis indicates that disparities in social and digital advancements (as measured in this research) are key drivers of migration flows. The three dimensions that form social distance, basic human needs, foundations of well-being and opportunity, are essential in understanding migration. In this regard, policy-makers from the origin countries should focus their attention on policies aimed at improving access to nutrition and basic medical care, access to basic education and information, and knowledge both from inside and outside their country. In addition, their efforts should target the protection measures of the natural environment and improved opportunities in achieving personal rights, personal freedom and choice, access to advanced education and inclusiveness.

Another important factor that helps understanding migration flows is digital performance, this study demonstrating that the higher the discrepancies between states in digital performance, the higher the propensity to migrate. In this view, the five dimensions through which we measured the digital distance: connectivity, human capital/digital skills, use of internet services, integration of digital technology and digital public services constitute fundamental areas that need improvements. More specifically, in the origin country policy-makers should put more efforts aimed at increasing the broadband coverage by households, at increasing the percentage of the population having basic digital skills and at creating more online channels of performing public services. Additionally, efforts of digitalization should also come from the enterprises in the origin country by increasing the use of cloud services and e-commerce.

TABLE 1 Summary statistics

	Outflows_2007	Outflows_2008	Outflows_2009	Outflows_2010	Outflows_2011	Outflows_2012	Outflows_2013	Outflows_2014	Outflows_2015	Outflows_2016
Mean	28629.58	17141.58	12,891	13656.89	15678.89	15060.5	14858.94	17868.95	18709.89	18580.21
Median	909	2,122	1,484	1726	2326.5	2,136	2,593	2,455	2,569	2,479
Standard Deviation	74233.86	41661.99	27352.99	27516.81	30817.58	32727.73	34092.7	45679.13	50517.92	50689.39
Minimum	0	0	0	0	0	0	1	6	14	1
Maximum	271,443	174,554	105,597	92,116	97,518	120,524	139,487	198,705	221,405	222,298
Count	19	19	19	19	18	18	18	19	19	19

	Outflows_2017	*Econ_iee*	*Econ_gdp*	*Econ_mw*	*Econ_tpe*	*Social_2014*	*Social_2015*	*Social_2016*	*Social_2017*	*Social_2018*	*Social_2019*
Mean	19275.63	4.60303	52.8181	658.6306	8.394762	10.70381	10.55762	10.60857	10.55286	10.99905	10.93333
Median	2,421	5.254545	46.58	515.56	8.83	10.77	10.61	11.75	11.75	12.28	11.96
Standard Deviation	52492.06	5.745048	44.3085	545.3642	1.038141	3.361903	3.347919	3.201688	3.447698	3.352946	3.343834
Minimum	32	−7.28182	6.42	87.37	6.3	5.04	4.78	4.7	4.14	4.71	3.96
Maximum	230,603	14.07273	208.42	1614.47	9.79	15.04	14.96	14.51	15.01	15.17	15.28
Count	19	21	21	16	21	21	21	21	21	21	21

	Cult_PDI	*Cult_UDI*	*Tech_2014*	*Tech_2015*	*Tech_2016*	*Tech_2017*	*Tech_2018*	*Tech_2019*
Mean	−41.2857	−20.7143	16.58952	17.14952	17.02238	17.24714	16.58143	18.28524
Median	−44	−20	15.96	17.59	17.34	17.12	16.43	17.4
Standard Deviation	20.55029	22.26689	9.472482	9.686269	9.716376	9.646682	9.621893	9.555476
Minimum	−79	−67	2.25	2.22	0.71	1.11	−0.42	1.49
Maximum	10	10	32.29	34.07	33.02	33.64	31.54	33.43
Count	21	21	21	21	21	21	21	21

TABLE 2 Indicators for reflective measurement model constructs

Indicators	Description	Source
Outflows	Migration outflows from Romania to 21 countries for each year between 2007 and 2017.	https://stats.oecd.org/
Econ_iee	The difference in the Index of Economic Freedom for 2007–2017.	https://www.heritage.org/index/
Econ_gdp	The difference in the *per capita* GDP for 2007–2017.	https://ec.europa.eu/eurostat (Online data code: TEC00114)
Econ_mw	The difference in the minimum wage for 2007–2017.	https://ec.europa.eu/eurostat (Online code data: earn_mw_cur)
Econ_tpe	The difference in the total public expenditure for 2008–2017.	https://ec.europa.eu/eurostat Online code data: [spr_exp_sum]
Social	The difference in the Social Progress Index for each year between 2014 and 2019.	https://www.socialprogress.org/index
Cult_PDI	The difference in the PDI Hofstede cultural dimension.	https://www.hofstede-insights.com/
Cult_UAI	The difference in the UAI Hofstede cultural dimension.	
Tech	The difference in the Digital Economy and Society Index for each year between 2014 and 2019.	https://ec.europa.eu/digital-single-market/en/desi

Note: Each indicator was calculated as the difference between each of the 21 country's scores and the scores for Romania.
Source: Authors' own elaboration.

6 | MEDIATION ANALYSIS RESULTS AND INTERPRETATION

The last section of this research focuses on the results of the mediation analysis. Mediation occurs when a third mediator variable intervenes between two other related constructs and, therefore, a mediator variable governs the nature of the relationship between two variables.

To test the mediation roles hypothesized in section three, the significance of the direct and indirect is tested through bootstrapping. Table 6 presents the significance of the direct and indirect effects of the mediator constructs. Applying the procedure of mediation analysis developed by Hair et al. (2017), it can be argued that there is no mediation of social distance on the relationship between economic distance and migration flows. Second, there is no mediation of social distance on the relationship between cultural distance and migration flows. Third, there is full mediation of digital distance (significant indirect effect of 0.809) on the relationship between cultural distance and migration flows. In other words, even if a high cultural distance between two countries may deter migration flows, increasing digitalization in origin and the destination countries encourage migration flows. This result is linked to the findings from the previous section stressing once more the importance of digital performance on migration. Lastly, the results indicate that there is no mediation of economic distance on the relationship between digital distance and migration flows (there is a significant direct-only effect of −1.132).

In addition, these results partially confirm the hypotheses stated in the section about the conceptual framework since:

- first, it demonstrates the existence of positive indirect effects of economic distance and digital distance on migration flows; and
- second, it shows a positive or a negative indirect effect of cultural distance on migration flows, depending on the mediator (a high positive effect of 0.809 through digital distance or a light negative effect of −0.069 through social distance).

TABLE 3 Results summary for the reflective measurement model

		Reliability Criteria			Validity Criteria	
		Indicator Reliability	Internal Consistency Reliability		Convergent Validity	Discriminant Validity
		Loadings	Composite Reliability	Cronbach's Alpha	AVE	HTMT Criterion
Latent variables	Indicators	>0.70	0.60–0.90	0.60–0.90	>0.50	HTMT confidence interval does not include 1
Migration flows	Outflows_2007	0.687	0.977	0.973	0.795	Yes
	Outflows_2008	0.785				
	Outflows_2009	0.904				
	Outflows_2010	0.964				
	Outflows_2011	0.990				
	Outflows_2012	0.987				
	Outflows_2013	0.945				
	Outflows_2014	0.894				
	Outflows_2015	0.873				
	Outflows_2016	0.867				
	Outflows_2017	0.864				
Econ dist.	Econ_iee	0.640	0.906	0.857	0.711	Yes
	Econ_ gdp	0.913				
	Econ_ mw	0.897				
	Econ_ tpe	0.893				
Social dist.	Social_2014	0.988	0.997	0.997	0.984	Yes
	Social_2015	0.989				
	Social_2016	0.995				
	Social_2017	0.995				
	Social_2018	0.995				
	Social_2019	0.988				
Cult dist.	Cult_PDI	0.883	0.869	0.697	0.768	Yes
	Cult_UAI	0.870				
Tech dist.	Tech_2014	0.995	0.999	0.999	0.994	Yes
	Tech_2015	0.997				
	Tech_2016	0.998				
	Tech_2017	0.999				
	Tech_2018	0.997				
	Tech_2019	0.995				

Source: Authors' own elaboration based on SmartPLS results.

The last step is the analysis of the significance of the total effects. Table 7 summarizes the results of the total effects of the exogenous constructs (economic, social, cultural and digital distance) on the target construct, migration flows, and also their total effects on the mediator variables. The results containing the coefficients of the total

TABLE 4 Heterotrait-Monotrait Ratio (HTMT)

	Cult dist.	Econ dist.	Migration flows	Social dist.	Tech dist.
Cult dist.	-	0.732	0.140	0.613	0.857
Econ dist.	0.732	-	0.218	0.848	0.782
Migration flows	0.140	0.218	-	0.219	0.193
Social dist.	0.613	0.848	0.219	-	0.751
Tech dist.	0.857	0.782	0.193	0.751	-

Source: SmartPLS results.

TABLE 5 VIF values in the structural model

	Econ dist.	Migration flows	Social dist.	Tech dist.
Cult dist.	-	2.096	1.468	1.000
Econ dist.	-	3.210	1.468	1.000
Social dist.	1.468	3.451	-	-
Tech dist.	1.000	3.553	-	-

Source: Authors' own elaboration based on SmartPLS results.

TABLE 6 Significance analysis of the direct and indirect effects

	Direct Effect	95% Confidence Interval of the Direct Effect	Significance ($p < 0.05$)?	Indirect Effect	95% Confidence Interval of the Indirect Effect	Significance ($p < 0.05$)?
Econ dist. → Migration flows (via Social dist.)	0.074	[−0.738, 0.816]	No	0.601	[−0.146, 1.372]	No
Cult dist. → Migration flows (via Social dist.)	−0.397	[−0.919, 0.110]	No	−0.069	[−0.598, 0.181]	No
Cult dist. → Migration flows (via Tech dist.)	−0.397	[−0.919, 0.110]	No	0.809	[0.220, 1.447]	Yes
Tech dist. → Migration flows (via Econ dist.)	−1.132	[−1.791, −0.233]	Yes	0.054	[−0.465, 0.670]	No

Source: Authors' own elaboration based on bootstrapping results.

effects, *p*-values and 95% confidence intervals were taken from the table of the bootstrapping results. As can be observed, all total effects are significant at a 5% level, except for the total effect of cultural distance on migration flows. As was acknowledged at the beginning of this paper, the other four dimensions from Hofstede's cultural model have been excluded given that they were not complying with reliability criteria. Therefore, this may be a possible explanation for the low significance level of this total effect.

TABLE 7 Significance testing results of the total effects

	Total effect	95% confidence intervals	Significance ($p < 0.05$)?
Cult dist. → Econ dist.	−0.518	[−0.670, −0.281]	Yes
Cult dist. → Migration flows	−0.008	[−0.288, 0.258]	No
Cult dist. → Social dist.	−0.478	[−0.710, −0.140]	Yes
Cult dist. → Tech dist.	−0.715	[−0.835, −0.455]	Yes
Econ dist. → Migration flows	0.676	[0.205, 1.125]	Yes
Econ dist. → Social dist.	0.756	[0.356, 1.028]	Yes
Social dist. → Migration flows	0.796	[−0.330, 1.377]	Yes
Tech dist. → Econ dist.	0.725	[0.514, 0.823]	Yes
Tech dist. → Migration flows	−0.642	[−1.231, 0.042]	Yes
Tech dist. → Social dist.	0.548	[0.249, 0.809]	Yes

Source: Authors' own elaboration based on bootstrapping results.

7 | CONCLUSIONS

This research adds a well-developed model to the literature about the key drivers of migration. In a world of intensified globalization where interconnectivity is increasing day by day, it seems almost mandatory to include technological/digital aspects in explaining migration issues. Comparing it with other techniques, this path model created through structural equation modelling offers a comprehensive perspective over migration determinants, taking into account four dimensions: economic, social, cultural and digital.

The path model developed in this exploratory research rests on hypotheses already stated in the literature. The results confirm the findings of previous studies, stressing the fact that social and technological developments have significant impacts on migration. The results indicate that the propensity to migrate is higher when there are increased wealth differentials between origin and destination regions and that propensity to migrate is greater when the dissatisfaction with the social conditions from the origin areas is rising. More specifically, it was demonstrated that economic distance has a positive effect on migration and that social distance has a positive significant effect on migration flows.

Furthermore, the findings suggest that migration flows are decreasing when the cultural differences between countries are increasing, especially when examining power distance and uncertainty avoidance. This result points out that high differences in the attitudes toward authority and uncertain situations affect migration negatively.

Fourth, the findings suggest that migration flows decrease when the differences in digital performance increase, indicating that digital distance has a negative significant effect on migration flows. In this regard, increasing EU investments in ICT development and digital competencies are crucial since it will diminish intra-EU discrepancies in technology use, and it will foster economic competitiveness.

The results of the mediation analysis indicate the existence of a full mediation effect of digital distance on the relationship between cultural distance and migration flows. In other words, even if a high cultural distance between countries may impede migration, advancements in digital technologies have a counteractive effect, favouring migration.

Drawing upon the above-mentioned results, this research has several noteworthy implications. First, as in the studies about the relationship between digital and economic development, there is a need to study more thoroughly the impact of digital performance on migration. Second, it draws particular attention to the social and digital developments in the origin countries. On this subject, these findings open up the debate on the necessity to adopt more measures targeted at improving countries of origin' digital performance and societal development. More investments

in digitalization and social advancement in the origin areas mean reduced disparities between these regions and the destination areas and better management of migration flows. Furthermore, these instruments will help improve subjective well-being (Clemens et al., 2014; Stillman et al., 2015) and reduce social exclusion (Novo-Corti et al., 2019; Picatoste et al., 2018), two of the main issues regarding the effects of migration on well-being.

On the one hand, this research has several shortcomings due to data unavailability regarding the Romanian migration flows to specific EU countries (shortcoming reflected in the low count data from Table 1) and the unavailability of specific indexes for Romania. On the other hand, this study was focused on demonstrating how this methodology can be applied, and future versions of this research may bring improvements to the theoretical framework (the model may include more dimensions) or/and to the application area (the model can be applied to other countries). Nevertheless, this study enriches the existing literature with an original well-developed path model that explains the complex relationships between migration flows and its key drivers.

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Resumen. Con mucha frecuencia, los estudios que explican las causas de la migración se centran en las explicaciones económicas y minimizan el poder explicativo de otros factores. El objeto de esta investigación es crear un modelo integral de los determinantes de la migración teniendo en cuenta cuatro dimensiones: económica, social, cultural y digital. Se creó un modelo de trayectoria compuesto por estas dimensiones y se estimó mediante un modelo de ecuaciones estructurales de mínimos cuadrados parciales (PLS-SEM, por sus siglas en inglés). El modelo de trayectoria PLS se aplicó a los flujos migratorios de Rumanía hacia 21 Estados miembros de la UE durante 2007–2017. Los hallazgos indican que los avances sociales y tecnológicos tienen un impacto significativo en los flujos migratorios y que la distancia digital tiene un efecto mediador pleno en la relación entre la distancia cultural y los flujos migratorios.

抄録: 移住についての研究は、経済的な説明に重点を置き、他の要因の説明力を最小化しているものが多い。本稿では、経済、社会、文化、デジタル技術の4つの側面を考慮した、移住の決定要因の包括的モデルを構築する。これらの側面からなるパスモデルを作成し、部分的最小二乗構造方程式モデル(Partial least squares – Structural Equation Modeling:PLS – SEM)を用いて推定した。PLSパスモデルを、2007~2017年のルーマニア移民の21のEU加盟国への移動フローに適用した。結果から、社会的・技術的な発展が移動フローに大きな影響を与えており、デジタル技術に関する距離が文化的距離と移動フローの関係に完全な媒介効果を与えていることが示唆される。