

# **E-GOVERNMENT IMPACT IN DOING BUSINESS DIMENSIONS, CORRUPTION PERCEPTION, ENTREPRENEURIAL ATTITUDES AND ACTIVITIES**

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## **ABSTRACT**

This article seeks to understand the impact of e-government readiness on ease of doing business, Corruption Perception and its relationships the on the attitude toward entrepreneurship and rate of new entrepreneurs. Data was collected from various databases, for the years 2008, 2010 and 2012 using a panel data study design. The study several reports: Doing Business Report from World Bank, E-Government Survey from the United Nations, Corruption Perception Index by Transparency International and GEM data from Global Entrepreneurship Monitor. Nonparametric correlation analysis and other statistical tests were performed. A model based on Azjen's Theory of Reasoned Action (with attitude, subjective norms and perceived control of behavior) was employed to predict entrepreneurial intention, and new business rate using the methodology of the partial least squares. The model was able to predict over 57% of the intention of starting a new business, which in turn predicted over 55 % of the rate of new business in the sample of countries and years considered (2008, 2010 and 2012). Future research to understand the real of impact of e-government is suggested.

## **KEYWORDS**

E-Government; Entrepreneurship; Doing Business; Attitudes; New Business

## **1. INTRODUCTION**

International research concerning e-government, its effects and benefits still is in the initial stages. Even though the volume of publications is growing, the first relevant articles only started to emerge in the 1990's, and did not receive much attention until the start of the 2000

decade. According to the Zouain, Almeida and Mahecha (2013) e-government is the most commonly cited term according to literature findings, but other terms like e-governance, online government, digital government, one-stop government, and electronic government, among others have been used interchangeably, although some authors point conceptual difference between them (Layne & Lee, 2001).

Consequently, the definition of what is e-government is still under construction; given that the term often carry many related meanings. For instance, West (2005) presents e-government as “public sector use of the Internet and other digital devices to deliver services, information, and democracy itself” (p. 1). Lau, Aboulhosen, Lin, and Atkin (2008) define it as the process of connecting citizens digitally to their government so it becomes possible to use information and services offered by government agencies. Howard (2001) defines e-government as the application of the tools and techniques of e-commerce to build the government interface with its stakeholders, focusing on cost reduction, efficiencies and gains of scale.

It is important is to be aware that most definitions highlight that e-government does not mean the mere use of information technology (IT) in the government. Instead it represents the introduction of a new interface with governmental stakeholders, since even long before the Internet had emerged in the late 1980s governments around the world were already actively pursuing IT solutions to improve operational efficiency, costs saving and data management (Brown 1999; Norris & Kraemer 1996).

However, modern forms of interaction between government and the stakeholders have emerged more recently. Due to the high growth of social media sites, Web 2.0 and related technologies, the e-government became more participative following these Internet trends. In this new form of interaction the e-government is becoming more consultative, with a two-way relationship, using citizens’ opinions and suggestions, and sporting a much higher participation of the citizens to support the definition of policies and priorities to the government, and providing a higher transparency of the government actions and spending (Halpern and Katz, 2012).

Business also can potentially benefit from a fast, responsive and complete e-government strategy. These characteristics are known as enablers for enterprise creation and maintenance, as measured by The Doing Business Report (World Bank, 2011). The Doing Business Report provides a quantitative measure of regulations for starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing business—as they apply to domestic small and medium-size enterprises (World Bank, 2011).

A better e-government strategy could, in theory, also diminish the corruption perception via added transparency and accountability of governmental transactions (Xenos & Moy, 2007) and provide easier access to services to start or operate a business, avoiding chances for corruption, since the procedures tend to be fast, functional and well reported. This would make a country more competitive with lower corruption and easier to conduct business, potentially resulting in creation of new firms.

Reduction of administrative costs, and time spent on government employees also are indicated as results of successful implementation of e-government (Jaeger, 2003). Gupta and Jana (2003) state that e-government is no longer just an option but a necessity for countries aiming for better governance. Similarly, Brunetti and Weder (2003) point out that free press has a strong association between level of press freedom and level of corruption across countries, even when using various instruments to measure freedom and corruption.

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The United Nations (UN) has created an index known as e-government Readiness Index, as an initiative to measure the progress of the adoption of the electronic government solutions in different countries composed by three sub-indexes: (four in 2012 e-government Readiness Index) online service, human capital, telecommunication infrastructure and e-participation indexes (UN, 2011). The e-readiness concept was created to provide a unified framework to evaluate the breadth and depth of the digital divide between more and less developed countries (P. Hanafizadeh, M.R. Hanafizadeh, & Khodabakhshi, 2009).

The Web Measure Index 2008 is based upon a five-stage model (Andersen & Henriksen, 2006), while in the 2010 report it was renamed to Online Service Development (United Nations, 2011), both were built upon the previous levels of sophistication of an UN Member State's online presence. As a country goes upwards through the various stages, it is ranked higher in the Web Measure Index (United Nations, 2009).

The Connected Government Stage is the most developed level of sophistication of the e-government and implies a governmental transformation into a connected entity that responds to the needs of its citizens by the development of an integrated back office. It also means a greater connection with different levels of governmental agencies (i.e., local, federal, state), between citizens and government, and between the citizen, government, and all stakeholders (United Nations, 2009).

In the past decade the most developed nations have made greater progress in the implementation of e-government solutions, especially the most developed European countries, U.S., South Korea and Japan, letting most of the world in a more modest state of adoption of more sophisticated e-government (Alomari, Woods & Sandhu, 2012; Khalil, 2011).

Dunleavy, Margetts, Bastow and Tinkle (2007) state that governments around the world spend every year billions of dollars in IT systems, in many countries it costs around 1.5 per cent of GDP yearly, for instance, the United Kingdom alone commits 14 billion £ a year to support public sector IT operations. Therefore, the level of e-government sophistication varies widely across the globe, since it requires substantial investment to enhance infrastructures as well as services to citizens (Ebrahim, & Irani, 2005).

In a study conducted by Zhao (2011), high correlations were found between GDP per capita and e-government development index ( $r=0.69$ ) and the telecommunication infrastructure index ( $r=0.81$ ), indicating that the level of economic development of a country is one of the major factors affecting the development of e-government and telecommunication infrastructures. Likewise, Khalil's (2011) study found that GDP explains 53% of the variance in e-government readiness.

Similarly, countries worldwide also significant a huge amount of resources to encourage, support and stimulate citizens to start new business (WONGLIMPIYARAT, 2009). The idea that the growth of small companies contributes to the economic prosperity is universally accepted (MARTIN & PICAZO, 2009). Regardless, the entrepreneurial rates and conditions vary widely between countries (BAUMOL, 1990, p.898), indicating that the entrepreneurial process has innumerable variables and particularities. Shapero and Sokol (1982) indicate that the convergence of attitudes and situational factors that spur a person to the start a business. Robinson, Shaver and Wrightsman (1991) define attitude as a learned predisposition to behave in a consistently favorable or unfavorable manner with respect to a given object.

One of the most used models to explain relationship between attitudes and behavior is the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). The authors affirm that attitudes and subjective norms should be combined to determine the intentions of behavior, which in turn would initiate the actual behavior or action. Ajzen (2011) also indicates that human

action is influenced by three different factors: a positive or negative evaluation of a behavior (attitude), a social pressure to realize or not the behavior (subjective norms) and the perception of being able to execute the behavior (self-efficacy).

Therefore, due to the nature of the data available, this study attempted to link the macro sociologic and micro sociologic approaches to understand how individual level attitudes, perceptions and intentions (like entrepreneurial intention, desirability of entrepreneurial career, etc.) and can be related (impact or be impacted) to country level behaviors and characteristics (doing business dimensions, e-government readiness, etc.).

According to Collins (1981) macrosociology is the analysis of events of large scale and of long-term impact, in aggregate levels like organizational, societal regional and cultural, while considering the macro sociological concepts as an aggregation of micro-events. The use of the multi-level sociological analysis is widely employed in many areas of the Social Sciences (Collins, 1981) and is considered an important and promising research approach (Borgatta, 1992).

In this paper, the impact of e-government readiness on corruption perception, the ease of doing business (macro level – country) and entrepreneurial attitudes (individual level – aggregated) were used to predict the intention of starting a business (also an individual level measure aggregated), on a model based on the TRA (Azen, 2011).

## 2. METHOD

This study used a panel design. Panel data means that a variable is measured more than once for the same subject, in different time periods. According to Hsiao (2003), panel data have been increasing popular mostly because there is a trend of a greater availability of data in this format, which is more able to answer substantial questions than a single set of indicators measured in a single point time that is usually found in cross sectional data. Although the use of panel data does not support the implication of causality, it certainly gives a stronger support in making assumptions about causality and directions of observed effects in many research areas.

The study can be classified as a non-experimental, since it uses survey data. The data used in this study is secondary, that is, other researchers or organizations collected it. All data and databases selected in this study are widely employed in many researches and were collected and compiled by internationally recognized institutions, such as World Bank, United Nations and others, which contribute to the validity and reliability of the data.

In addition, the study can be classified as a correlational study, since it is conducted to determine the relationship between variables (MARCZYK et al, 2005), even though it employs additional techniques such as partial least squares (PLS) modelling.

The statistical analysis were performed with the software: SPSS 20.0 (IBM) and SMARTPLS 2.0, employed to compute non-parametric correlations, partial least square model specification, and data input, analysis and treatment. The figure 1 shows the study design:

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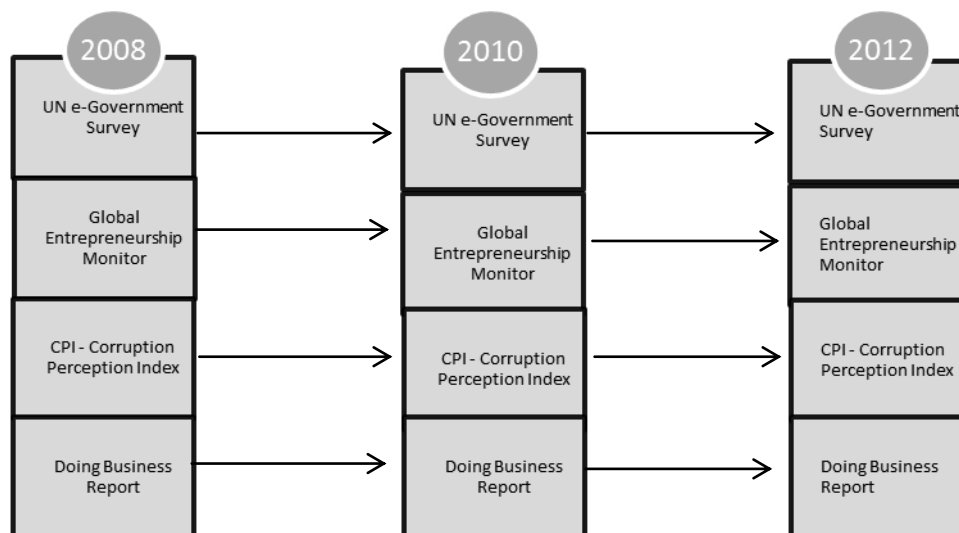


Figure 1. Scheme for the Data for the Study

Data were obtained for three years (2008, 2010 and 2012). The databases used were Doing Business Report in the years 2008, 2010 and 2012 edited by the World Bank (World Bank, 2009), UN e-government survey 2008, 2010 and 2012 (UN, 2012). The data were imported and treated in Microsoft Excel 2010. The following variables from the Global Entrepreneurship Monitor Data for 2008, 2010 and 2011 were used:

Table 1. Definitions of the variables used from the global Entrepreneurship Monitor

Variable	Definition (Percentage of 18-64 population)
<b>Established Business Ownership Rate</b>	% who are currently owner-manager of an established business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments
<b>New Business Ownership Rate</b>	% who are currently an owner-manager of a new business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than three months, but not more than 42 months
<b>Fear of Failure Rate</b>	% with positive perceived opportunities who indicate that fear of failure would prevent them from setting up a business
<b>Entrepreneurship as Desirable Career Choice</b>	% who agree with the statement that in their country, most people consider starting a business as a desirable career choice
<b>Perceived Opportunities</b>	% who see good opportunities to start a firm in the area where they live
<b>Entrepreneurial Intention</b>	% (individuals involved in any stage of entrepreneurial activity excluded) who intend to start a business within three years
<b>Perceived Capabilities</b>	% who believe to have the required skills and knowledge to start a business
<b>Media Attention for Entrepreneurship</b>	% who agree with the statement that in their country, you will often see stories in the public media about successful new businesses
<b>High Status Successful Entrepreneurship</b>	% who agree with the statement that in their country, successful entrepreneurs receive high status

Source: Global Entrepreneurship Monitor (GEM) Key Indicators and Definitions (2011)

Finally, the last report utilized was the Corruption Perception Index (CPI), that measures the perceived level of public-sector corruption in 180 countries and territories around the world (Transparency International, 2010), for 2008, 2010 and 2012.

Concerning GEM data, when the data was analyzed, the GEM 2011 was the most updated year, and was used as a proxy for 2012 data. During the presentation of the results, some indicators were inverted to provide an easier interpretation of the correlation coefficients; and are represented with (INV).

### 3. ANALYSIS

After the consolidation, test for errors, and visual inspection, the distribution of the data was tested by the Kolmogorov-Smirnov one-sample test. The null hypothesis of this procedure states that the distribution is normal, and p-values higher than 0.05 indicate that the data has an approximately normal distribution, and therefore suited to undergo tests and procedures that require the normality to provide adequate results (HAIR et al, 2010).

The results indicated that the majority of the variables tested did not have a normal distribution. Just four variables had non-significant results (i.e p-value > 0.05), that means that the distribution is normal: E-government index ( $Z=1.142$ ;  $p=0.147$ ), % respondents that think that having a new business is desirable career choice ( $Z=0.961$ ;  $p=0.314$ ), % respondents agree entrepreneurship has high status ( $Z=1.112$ ;  $p=0.168$ ) and % respondents that see opportunities where they live ( $Z=0.662$ ;  $p=0.774$ ). All others variable were non-normal.

Given the results, the Spearman's correlation coefficient was used to understand the relationship between the variables. According to Miles and Shevlin (2001) when the relationship between two variables is not normally bi-variate or when one is measured at a ordinal level, the Pearson coefficient may not be the best estimative. The Spearman coefficient measures the intensity of relationship using ranking position instead of the observed values (Miles & Shevlin, 2001). The results are presented in the table 2:

Table 2. Spearman correlations between E-government ranking and ease of doing business rankings

	<b>E-Government ranking (INV)</b>	<b>Corruption Perception</b>	<b>New Business Ownership</b>
<b>E-Government Ranking (INV)</b>	1,000	,742**	-,540**
<b>Corruption Perception Index</b>	,742**	1,000	-,514**
<b>Doing Business - Closing a Business (INV)</b>	,657**	,660**	1,000
<b>Doing Business - Construction Permit (INV)</b>	,365**	,491**	-,417**
<b>Doing Business - Enforcing Contracts (INV)</b>	,561**	,508**	-,252**
<b>DB - Ease of doing business ranking (INV)</b>	,777**	,785**	-,318**
<b>Doing Business - Getting Credit (INV)</b>	,639**	,541**	-,411**
<b>Doing Business - Paying taxes (INV)</b>	,363**	,530**	-,294**
<b>Doing Business - Protecting investors (INV)</b>	,457**	,431**	-,194**
<b>Doing Business -Registering property (INV)</b>	,481**	,438**	-,170*
<b>Doing Business - Starting a business (INV)</b>	,488**	,528**	-,112
<b>DB - Trading (INV)</b>	,668**	,733**	-,357**

\*\* . Correlation is significant at the 0.01 level (2-tailed). (INV) –variables inverted to provide easier interpretation. \* . Correlation is significant at the 0.05 level (2-tailed).

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For the data relations considered, a higher ranking in e-government readiness was associated with lower Corruption Perception. In addition, the dimensions of Ease of Doing Business were inversely associated with perception of corruption.

Tests performed indicate that there is no significant difference between the attitudes and activities in the years 2008 2009 and 2012 (ANOVA test, p statistic ranging from 0.331 to 0.773), indicating that these attribute tend to be constant throughout the years, although all indicators are widely unequal between countries (F statistic ranging from 9.06 to 40.706, p<0.001).

Furthermore, the ranking scores were inverted to allow an easier interpretation of the results, since a high CPI indicates low perception of corruption. It means that the better a given country ranks in e-government readiness and ease of doing business, the less corrupt it appears. Nevertheless, countries with better ranking on doing business, and e-government readiness seem to sport a lower rate of population owning a new business than the countries that are more perceived as corrupt.

Table 3. Correlations between entrepreneurship attitudes and activities

	1	2	3	4	5	6	7	8	9
New Bus. Owner. Rate(1)	1,00	,515**	,732**	-,291**	,704**	,494**	,449**	,342**	,554**
Perceived Opport.(2)	,515**	1,000	,279**	-,256**	,494**	,349**	,333**	,351**	,577**
Estab. Bus Owner. (3)	,732**	,279**	1,000	-,221**	,424**	,211**	,324**	,262**	,350**
Fear of Failure Rate (4)	-,291**	-,256**	-,221**	1,000	-,240**	-,240**	-,116	-,074	-,445**
Ent. Intention (5)	,704**	,494**	,424**	-,240**	1,000	,562**	,272**	,288**	,647**
Ent. Desirable Career (6)	,494**	,349**	,211**	-,240**	,562**	1,000	,358**	,447**	,553**
Media Attention (7)	,449**	,333**	,324**	-,116	,272**	,358**	1,000	,380**	,241**
High Status Ent. (8)	,342**	,351**	,262**	-,074	,288**	,447**	,380**	1,000	,280**
Perceived Capabil. (9)	,554**	,577**	,350**	-,445**	,647**	,553**	,241**	,280**	1,000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis indicate that the higher percentage of the population perceive opportunities to start a firm, and where entrepreneurship holds a higher status as an occupation, and a more favorable media coverage, people tend to have less fear of failure to start a business, and are more willing to start a new business in the next three years. These countries also have a present with a higher rate of new business.

After performing the correlational analysis, a Partial Least Squares (PLS) model was specified to regress the various predictors into the new business owner rate. Rigdon (1998) point out that structural equation modeling (SEM) has taken up a prominent role within the academic literature of many fields.

The partial least squares approach to SEM (or PLS path modeling), was originally developed by Wold (1966), and is an alternative to the more prominent covariance-based method.

In PLS the explained variance of the endogenous latent variables is maximized by estimating partial model relationships in an iterative sequence of ordinary least squares (OLS) regressions. Other advantage is that PLS path modeling is a soft-modeling technique that has less rigid distributional assumptions on the data (Hair, Ringle, & Sarstedt, 2011).

For this procedure were selected the variables that could be possible predictors of new business, according to the literature review, and then those variables were inserted in SmartPLS software version 2.0. To emulate Azjen's (2011) components of the Theory of

Reasoned Action we used the Perceived Opportunities and Entrepreneurship as Desirable Career as the *Attitudinal* component, the variables High Status Entrepreneurship and Media Attention for Entrepreneurship as the *Subjective* component and perceived capabilities as the *Perceived Behavioral Control* component.

Furthermore the other variables were e-government ranking (INV), Doing Business Ranking (INV), Corruption Perception Index, and as the dependent variables, we have selected new business ownership rate and entrepreneurial intention. The model, with the associated statistics, is available in figure 2:

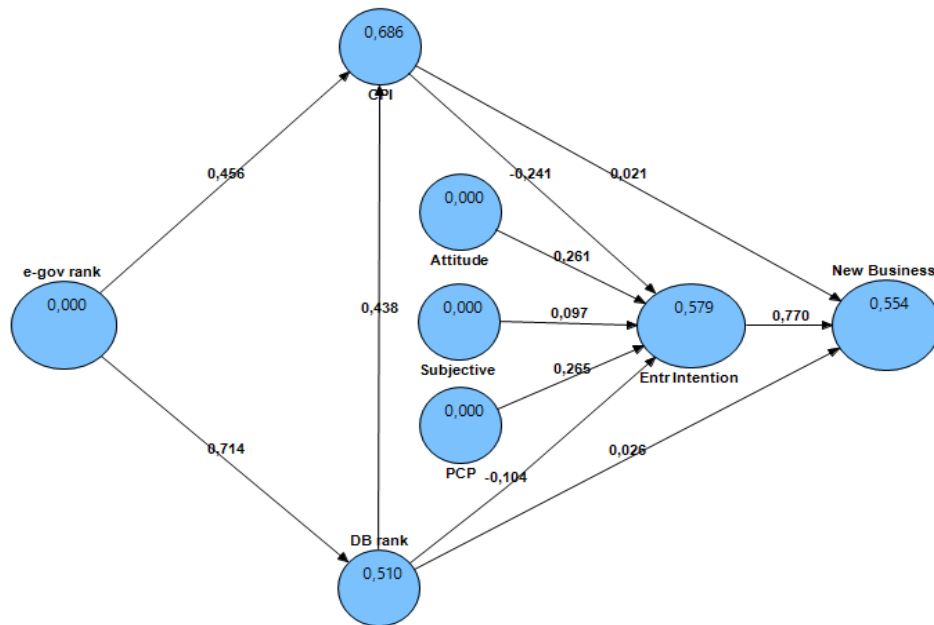


Figure 2. PLS Model Estimation of entrepreneurial intention and new business ownership rate

The model was able to explain almost 56% of the variance on the rate of new entrepreneurs ( $r^2=0.554$ ;  $p<0.000$ ). In a similar way, the proposed three components of attitude toward entrepreneurship, subjective norms and perceived control of behavior, explained almost 58 % of the entrepreneurial intention.

Although the e-government was positively correlated, and predicted very well doing business ranking position ( $r^2=0.510$ ;  $p<0.000$ ) and lower perception of corruption ( $r^2=0.686$ ;  $p<0.000$ ), it did not influence positively the entrepreneurial intention, and only had a marginal impact in the rate of new business.

To access the statistical significance of the path coefficients a bootstrapping with 1000 resampling was performed. Boot strapping is a resampling method for assigning measures of accuracy to sample estimates, allowing the estimation of the distribution of almost any statistic (Efron & Tibshirani, 1993). In addition, the bootstrapping is robust to violations of normality of the data, which is in turn, an assumption of most parametric techniques.

Additionally, another feature of PLS (and SEM family of analysis) is that the relationship between variables can be better modelled than in regular linear regression models, since it allows for the calculation of direct, indirect and total effects. The calculation of the total effect



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is important to understand relationships modeled that employ a more complex logic of inter-relationships that are better representations of real world phenomena.

Although all effects were calculated (direct, indirect and total), for the sake of the simplicity, only the total effects and bootstrap related statistics are displayed in table 4:

Table 4. Boot strapping - Total effects and related statistics

Effect (Endogenous -> Exogenous)	Original Sample (O)	Sample Mean (M)	Std Dev	Std Error	T Statistic
Attitude -> Ent. Intention	0,2612	0,2648	0,0435	0,0435	6,0063
Attitude -> New Business Rate	0,2011	0,2039	0,0350	0,0350	5,7493
Corruption Percep. -> Entr. Intention	-0,2411	-0,2413	0,0380	0,0380	6,3480
Corruption Perception -> New Business Rate	-0,1650	-0,1641	0,0469	0,0469	3,5173
DB Ranking -> Corruption Perception	0,4383	0,4395	0,0306	0,0306	14,3041
DB Ranking -> Entrepreneurial Intention	-0,2099	-0,2107	0,0391	0,0391	5,3663
DB Ranking -> New Business Rate	-0,1260	-0,1275	0,0516	0,0516	2,4405
Entr Intention -> New Business Rate	0,7701	0,7698	0,0333	0,0333	23,1451
Perceived C. of Behavior -> Ent. Intention	0,2651	0,2607	0,0372	0,0372	7,1161
Perceived C. of Behavior -> New Bus. Rate	0,2041	0,2010	0,0319	0,0319	6,3969
Subjective Norms -> Ent. Intention	0,0969	0,0977	0,0347	0,0347	2,7892
Subjective Norms -> New Business Rate	0,0746	0,0753	0,0272	0,0272	2,7475
E-gov ranking -> Corruption Perception	0,7691	0,7688	0,0120	0,0120	64,0158
E-gov ranking -> DB rank	0,7144	0,7135	0,0213	0,0213	33,4746
E-gov ranking -> Entrepreneurial Intention	-0,2599	-0,2605	0,0295	0,0295	8,7961
E-government ranking -> New Business Rate	-0,1653	-0,1661	0,0303	0,0303	5,4501

**Parameters:** Missing Values - Case Wise replacement- 549 cases (all periods included) - 1000 resampling performed

The results of the boot strapping show that all total effects were statistically significant (t-statistic ranging from 2.774 to 64.015). The higher effect was from E-government to Corruption Perception with a path coefficient of 0.7691 ( $p < 0.001$ ), the lower was from the Subjective Norms Component, composed of high status and positive media depiction of entrepreneurship, to New Business Rate with a path coefficient of 0.0746 ( $p = 0.005$ ).

Since the e-government readiness is composed by the three sub-indexes: human capital, infrastructure and online services, an additional correlation analysis was performed, and infrastructure was the most related index to new business rate, again in an inverse relationship, as seen in figure 3:

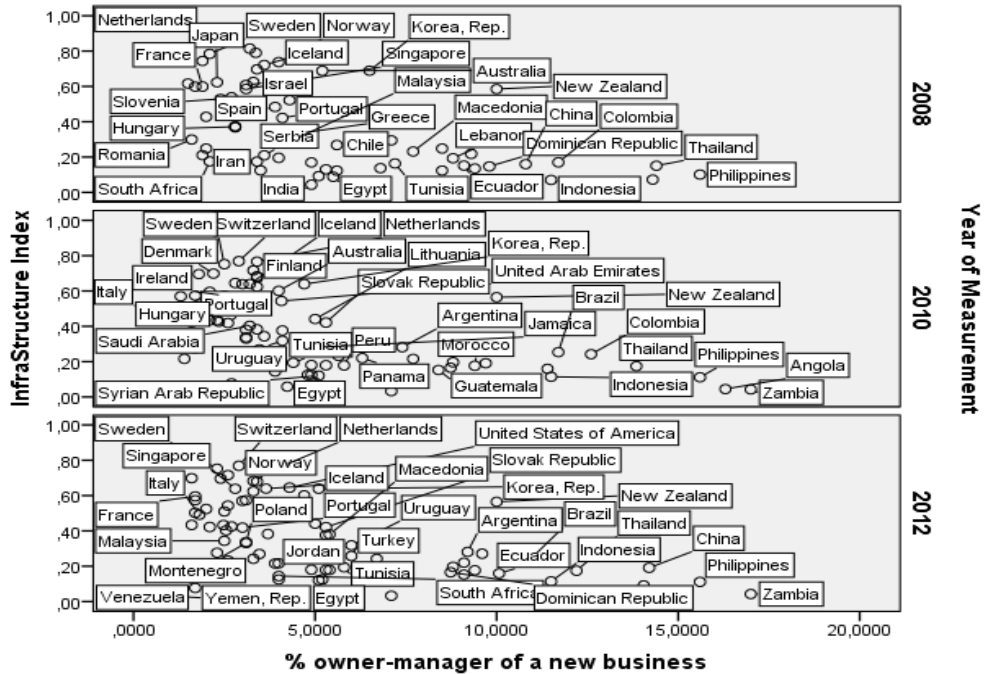


Figure 3. E-government readiness and infrastructure compared with new business rate.

The figure 3 shows a multi-year representation that shows a clear pattern indicating that the less developed countries (using infrastructure as a proxy) have a significantly higher percentage of owner or manager of a new business in three years considered. These countries seem to be economies that have been sporting a recent growth in recent years. This fact lead to a spurious correlation, that in a first sight would suggest that e-government and better business atmosphere (as measured by doing business indicators) would be in detrimental to new business creation, but in fact indicate that other factors that are driving growth in those countries despite the difficulty to conduct business in those economies.

#### 4. CONCLUSION

The results were in the most part according to the expected relationships according to the literature review, indicating that the e-government readiness is highly related with the ease of doing business dimensions and with lower perception of corruption in the studied countries. In addition, in the model that was specified to test Azjen’s Theory of Reasoned Action in context of entrepreneurship was also statistically significant, predicting over 57% of the intention of starting a new business, which in turn predicted over 55 % of the rate of new business in the sample of countries and years considered (2008, 2010 and 2012).

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An important feature of PLS methodology that was used is to calculate the total effect, that is, direct and indirect effects, and its significance. These results show that all considered relationships were statistically significant, although the sign of the impact of e-government readiness ranking, doing business ranking and corruption perception index were all negative.

This result can be attributed to the lower growth of the more developed countries in the considered years, coupled with a lower intention to start a new business, probably due to economic crisis and governmental austerity measures, mainly in European countries. To test this hypothesis future research should run models with different groups, and considering GDP growth and other variables to corroborate those affirmations.

In the same way, it is always important to note that the composition formula for the e-government readiness index indicates that to furnish a successful web-presence is not the sole answer for a successful e-govern implementation (UN, 2009).

The dimensions of formal education and infrastructure are determinant to the use of the electronic platforms by the recipients, the country citizens. The more prepared the population is to use the tools provided, the higher would be the effectiveness of a given e-govern initiative. Several studies point out that in the implementation of e-government projects the main problems usually are not technical, but instead were policy issues (EGOV, 2003).

Also, although e-government can help the establishment of entrepreneurship, many other factors are at play including economic and social variables that were not considered in this research, and in most cases are not within e-government possible range of interference. For the future research, we suggest that the way in which the e-government initiatives impacts developed and in development countries be investigated, using divided samples, and additional databases, and other research designs, including case studies.

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