ASSOCIAÇÃO DE POLITÉCNICOS DO NORTE **(APNOR)**

INSTITUTO POLITÉCNICO DE BRAGANÇA

DOING BUSINESS AND COMPETITIVENESS ENVIRONMENT TO EVALUATE COUNTRIES FOR OPERATIONS IN THE INFORMATION AND COMMUNICATION TECHNOLOGIES

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Final Dissertation submitted to *Instituto Politécnico de Bragança*

to obtain the Master Degree in Management, Specialisation in Business Management

Supervisors:

Alcina Maria de Almeida Rodrigues Nunes

Arevshatyan Gevorg

***Bragança*, July, 2017.**

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Abstract

Information and Communication Technologies (ICT) are a fundamental part of a good business environment. In the past year Doing Business recorded 50 reforms establishing or improving online tools for regulatory processes (World Bank, 2016). Authors like Jerbashian and Kochanova (2016), for example, use Doing Business indicators to discover and examine how country-level regulations of business impact industry-level investments in ICT. Having as the main objective to understand how the business environment and competitiveness of an economy allows the introduction of companies in the ICT sector, it is proposed to develop a scientific work which implements business environmental scanning that allows strategic planning of activities based on analysis and comparison of broad indicators of opportunities and efficiency for various countries Environmental scanning is a process that systematically surveys and interprets relevant data to identify external opportunities and threats. An organization gathers information about the external world, its competitors and itself. The company should then respond to the information gathered by changing its strategies and plans when the need arises. For implementing an environmental scanning three well-known and worldwide databases are used: the Doing Business project, the Global Competitiveness Index and the ICT Development Index were used. Methodology allows to evaluate countries and compare them with each other in terms of investment attractiveness in the ICT sector. Results present a list of 40 countries that rank best among others regarding their business climate, competitiveness and operations of economic agents in the ICT sector as well as its sub-sectors: R&D, Production, and Services.

Keywords: Environmental Scanning, Doing Business, Global Competitiveness Index, ICT Development Index, Information and Communication Technologies (ICT)

Resumo

s Tecnologias de Informação e Comunicação (TIC) são uma parte fundamental de um bom ambiente empresarial. Por exemplo, só no ano passado, o relatório do *Doing Business* registrou 50 reformas, que estabeleciam ou melhoravam as ferramentas *online* utilizadas en processos regulatórios (Banco Mundial, 2016). Autores como Jerbashian e Kochanova (2016), por exemplo, utilizam os indicadores do *Doing Business* para descobrir e analisar a forma como as regulamentações empresariais numa economia afetam os investimentos no setor das TIC. Tendo como objetivo principal compreender como o enquadramento empresarial e a competitividade de uma economia permitem a introdução de empresas no setor das TIC, propõe-se desenvolver um trabalho científico que implemente um processo de *scanning* empresarial que permita realizar um planeamento estratégico das atividades com base na análise e comparação de indicadores amplos de oportunidades e risco para os diversos países. O processo de *scanning* empresarial analisa, sistematicamente, e interpreta os dados relevantes para identificar oportunidades e ameaças externas. Neste processo uma empresa/organização reúne informações sobre o mundo externo, os seus potenciais concorrentes e sobre si própria . A empresa/organização deve responder às informações recolhidas alterando as suas estratégias e planos quando necessário. Para a implementação deste procedimento de análise foram utilizadas três bases de dados bem conhecidas internacionalmente: o projeto *Doing Business*, o *Global Competitiveness Index* e o *ICT Development Index*. A metodologia permite avaliar países e compará-los uns com os outros em termos de atratividade de investimento no setor das TIC. Os resultados permitem apresentar uma lista de 40 países que se classificam melhor em relação ao ambiente de negócios, competitividade e operações de agentes económicos no setor das TIC, bem como nos seus subsectores: I&D, Produção e Serviços.

Palavras-chave: *Scanning* ambiental, *Doing Business*, *Global Competitiveness Index*, *ICT Development Index*, Tecnologias de informação e comunicação (TIC)

Համառոտագիր

Ինֆորմացիոն և տեղեկատվական տեխնոլոգիաները կազմում են բիզնես կարգավորումների բաղկացուցիչ մաս: Միայն վերջին տարում Դուինգ Բիզնեսը հրապարակել է կանոնակարգման գործընթացների հաստատման կամ բարելավման օնլայն գործիքների մասին 50 բարեփոխումներ (Համաշխարհային բանկի խումբ, 2016): Օրինակ Հեղինակներ Ջրբաշյանը և Քոչանովան (2016), օգտագործում են Դուինգ Բիզնեսի ցուցանիշները բացահայտելու և ուսումասիրելու, թե ինչպես են տարբեր երկրներում բիզնեսի կարգավորումները ազդեցությունունենում ՏՀՏ ներդրումների վրա:

Սույն աշխատանքի հիմնական նպատակն է հասկանալ, թե տնտեսության բիզնեսը և մրցունակությունը թույլ է տալիս նման ՏՀՏի ներմուծումը, առաջարկում ենք զարգացնել գիտական աշխատություն, որը կիրականացանի բիզնեսի տեսանկյունից շրջակա միջավայրի ուսումնասիրություն ռազմավարական կառավարման մեթոդներով և համեմատել երկրները ավելի լայն հնարավորությունների ցուցանիշներով և ռիսկերով: Շրջակա միջավայրի ուսումնասիրությունը գործնթաց է, որը պարբերաբար հետազոտում և ամփոփում է համապատասխան տվյալները, որպեսզի հայտնաբերվեն արտաքին հնարավորությունները և վտանգները (Դանիելս, Ռադեբու և Սուլլիվան,2015). Կազմակերպությունը հավաքագրում է տեղեկություն արտաքին աշխարհի, մրցակիցների և ինքն իր մասին: Այնուհետև ընկերությունը պետք է համարժեքորեն պատրաստի տեղեկությունը, որը հավաքագրվել է ստրատեգիաների և ծրագրերի փոփոխման արդյունքում, երբ առաջանում է փոփոխությունների անհրաժեշտությունը (Լապին, 2014):

Շրջակա միջավայրի ուսումնասիրության համար օգտագործվում է 3 հայտնի տվյալների բազա. «Դուինգ բիզնես» նախագիծ, «Գլոբալ մրցունակության» ինդեքս և «ՏՀՏ զարգացման» ինդեքս: Մեթոդաբանությունը թույլ է տալիս գնահատել երկրներին և համեմատել միմյանց հետ ներդրումային գրավչության առումով: Արդյունքները ներկայացնում են ցանկ՝ բաղկացած 40 երկրներից, որոնք ունեն լավագույն վարկանիշները ըստ իրենց գործարար միջավայրի, մրցունակության և ՏՀՏ ոլորտում տնտեսվարող սուբյեկտների գործառնությամբ, ինչպես նաև ենթաոլորտներում՝ հետազոտությունների և զարգացման, արտադրության և ծառայությունների:

Հիմնաբառեր: Դուինգ Բիզնես, Մրցունակության Համաշխարհային Ինդեքսը , շրջակա միջավայրի ուսումնասիրություն ,Տեղեկատվական և հաղորդակցական տեխնոլոգիաներ

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Abbreviations and/or Acronyms

ADDING - Adding volume, Decreasing costs, Differentiating benefits, Improving industry attractiveness, Normalizing risk, Generating and deploying knowledge.

DTF - Distance to Frontier

GDP - Gross Domestic Product

GCI - Global Competitiveness Index

ICT - Information and Communication Technologies

IDI – ICT Development Index

ITU - International Telecommunication Union

FDI-Foreign Direct Investment

PFI - Policy Framework for Investment

PESTEL - Political environment, Economic environment, Sociocultural environment, Technological environment, Ecological environment, Legal environment

PCT - Patent Cooperation Treaty

OECD - Organisation for Economic Co-operation and Development

SME - Small and Medium Enterprises

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Introduction

In the 21st century it is more than evident that companies have to use Information and Communication Technologies (ICT) to survive in the highly competitive business markets. As globalisation is increasing in the world economy, time and space are changing the values of companies. So increasing the role of ICT in further business investments – which allows a higher development of the countries' economies - depends on the level of investment in ICT infrastructures, the level of innovation put in practice, and also the level of research and development carried out by firms.

The countries present high differences in their levels of development and the business environment they present to potential investors. So, investors (managers already working or new business owners) in order to make an investment decision have to decide between "easy money with high risks" and lower competitiveness in developing countries and make investments in developed countries with higher competitiveness but lower risk. At the same time, potential new investors, venture companies and other interested parties tend to invest in ICT activities. But, to choose where to invest, it is necessary to take into account certain factors. There are more than 200 different countries in the world, which make it hard to choose which is the more attractive country for a particular business investment. In this work the particular business investment will consider the ICT business activity area.

Having as the main objective to understand how the business environment and competitiveness of an economy allows the introduction of companies in the ICT sector, it is proposed to develop a scientific work which implements business environmental scanning that allows strategic planning of activities based on analysis and comparison of broad indicators of opportunities and efficiency for various countries. Environmental scanning is a process that systematically surveys and interprets relevant data to identify external opportunities and threats (Daniels, Radebaugh, & Sullivan, 2015). An organization gathers information about the external world, its competitors and itself. The company should then respond to the information gathered by changing its strategies and plans when the need arises (Lapin, 2004). Indeed, the main objective of this study is to evaluate countries using a ranking system and to create a list of the top 40 most attractive countries in terms of investments in the ICT sector.

Data for analysis is gathered from several three datasets: The Doing Business project, the Global Competitiveness Index and the ICT Development Index. The Doing Business project (World Bank, 2016) provides objective measures of business regulations and their enforcement across 190 economies and selected cities at the sub national and regional level. By gathering and analysing comprehensive quantitative data to compare business regulation environments across economies and over time, Doing Business encourages economies to compete towards more efficient regulation; offers measurable benchmarks for reform; and serves as a resource for academics, journalists, private sector researchers

and others interested in the business climate of each economy. At the same time, the Global Competitiveness Index (GCI) measures “the set of institutions, factors and policies that set the sustainable current and medium-term levels of economic prosperity” in other words, those factors that facilitate or drive productivity (Gaportal, 2016). The index is composed of 12 pillars of competitiveness - organized into efficiency enhancers, innovation and sophistication factors - and attempts to take into account countries' different stages of economic development. Finally, the ICT Development Index is an Index specifically prepared to analyse the ICT sector in each economy.

The research work consists of three parts. The first part presents the theoretical research on the concept of business environment for investments, with attention to special projects that assess country’s business environment. The second part presents the objective of the study, the analysed data and the methodology used. The third part shows the results of the study that are expected to fulfil the objective proposed. The research paper ends with the conclusion proposals of future research.

1. Business environment for investments: how to choose an international location

1.1. Institutional framework for business investment

In order to implement business investments in other countries both small and medium size companies as well as multinational companies must have reliable information about environment of the potential location countries. Some of the significant sources of information regarding the institutional framework for business investment of the abovementioned companies are the following projects: The Doing Business project with its indicators and the Global Competitiveness Index. If the companies operate in the Information Communication Technology (ICT) sector another source of information are the International Telecommunication Union's reports.

Every country has to have a Policy Framework for Investment (PFI) that could mobilise private investment that supports steady economic growth and sustainable development, contributing to the economic and social well-being of the population. Such framework should include all forms of investment and types of firms (OECD, 2015). According to the Organization for Economic Cooperation and Development (OECD), a good investment climate is one which provides opportunities for all investors (both public and private, large and small and foreign and domestic) and follows coherent public policies. Such policy coherence applies to each component of the investment climate, whether encouraging foreign investment, promoting linkages and technology spill overs raising the quality of the workforce or improving infrastructure or any other area (OECD, 2015).

All organizations (including business companies) need to identify external factors within their domestic environment or in international business environments that could have an impact on their operations. Many external factors will include things that the organization has no control over but whose implications need to be understood. A popular tool for identifying these external factors is the PESTEL analysis. The

term ‘PESTEL’ comes from the names of the six main environmental spheres of the company and its competitive arenas: political environment, economic environment, socio-cultural environment, technological environment, ecological environment, legal environment(Grünig & Morschett*,* 2011).The selection of target markets is an important and at the same time difficult task: (i) It is important because the success or failure of going international for new markets strongly depends on it. The best strategy for building up new markets and the best market entry project plans are useless if the wrong markets are targeted; (ii) The task is difficult, because many industry markets in many countries often come into consideration, and because the selection is based on numerous and partially qualitative criteria. The PESTEL analysis is a grid which can be used to structure the country analysis. Important individual aspects can be analysed with macroeconomic indicators, approaches for assessing political risks and methods for evaluating cultural distances (Grünig & Morschett*,* 2011).

The precise economic, social, technological, legal and institutional framework for any given investment depends highly on the facts and circumstances related with that particular investment (Al Khattab, Aldehayyat & Stein, 2010).For example, regulatory and institutional risks may vary depending on whether a transaction is an acquisition by merger, an acquisition of assets, a greenfield[1]investmentor an acquisition of a majority/minority of shares. Fagan (2010), using the particular example of the United States economy, describes other factors that may impact the legal risk and strategy for market entry which include: (i) the location of the investment; (ii) the sector or industry of the investment; (iii) the size of the investment; (iv) the specific facts of a particular transaction and (v) the characteristics of the transaction parties.

The Risk management protects and adds value to an organisation and its stakeholders through supporting the organisation’s objectives by: (i) providing a framework that enables future activity to take place in a consistent and controlled manner; (ii) improving decision making, planning and prioritisation by understanding the business activity, volatility and project opportunity/threat; (iii)contributing to more efficient use/allocation of capital and resources within the organisation; (iv) reducing volatility in the business’ non-essential areas; (v) protecting and enhancing assets and company image; (vi) developing and supporting people and the organisation’s knowledge base; and (vii) optimising operational efficiency (IRM, 2002).

1.2. Countries’ business risk assessment

“The rapid growth of trade and investment flows and the need to make decisions about assets or activities in other countries, require multinational corporations (MNCs) to assess commercial risks such as local markets and competition, transportation costs, availability of labour and the level of other relevant local

[1]A greenfield investment consists on the establishment of a new manufacturing plant, workshop, office, etc. by a firm. The greenfield investment is undertaken by a ‘start-up' (i.e. new) business and by existing firms as a means of expanding their activities (The free dictionary, 2017).

costs(Al Khattab, et al, 2010, p. 54). For international investors country risk assessment is an essential factor in the investment process. Country risk is the potential volatility and default in financial assets due to political and/or financial events in the given country. So, understanding the relations between international stock markets and how these linkages vary through time is of great importance for country risk diversification (Marshall, Maulana & Tang, 2009). Al Khattab, et al (2010, p. 55) by examining sources of information that are used for a country's (business) risk assessment, divide it into two main objectives: (1) to analyse current managerial practices in multinational corporations with regard to the sources of information used for country risk assessment and (2) to explore the correlations between the sources of information used and corporation-specific characteristics of the organisations surveyed.

Markides and Williamson (1994) had previously warned that diversification into new markets could bring with it the risk that an organisation loses focus and weakens its core competencies and, in consequence, the organisations' overall profitability. Only through strategic diversification, by which the company ensures that there is a strong strategic fit and leverage of its core competencies, that an extension of the activities may improve profitability. According with the authors, strategic diversification should imply a synergy with the new business that reinforces the core competencies of the company, i.e., knowledge and expertise.

1.2.1. The particular case of doing business in ICT

As ICT have become one of the main driving forces of globalization, they have been also increasingly perceived as a major factor determining the comparative advantage of nations and the competitiveness of their economies due to its potential to generate socio-economic transformations (Baskaran & Muchie, 2007). The authors argue that ICT provide a key opportunity for particularly developing countries to address problems in the field of education, health, rural development, poverty alleviation and employment.

Indeed, Pham (2014) stresses the idea that ICT area is an essential driver for development by expanding economic opportunities. According with the author, developed countries tend to gain more advantages from ICT sectors than developing countries (that was the example of newly industrialized countries back in 1980s). Other authors, like Bankole, Osei-Bryson and Brown (2015), explored the impact of ICT infrastructures and complementary factors on intra-African trade and showed that the telecommunications infrastructure had a major impact on intra-African trade. In the study of Taylor, Ffowcs-Williams and Crowe (2008), the authors analysed an initiative to support and encourage capacity building in remote desert centres and to create networks to overcome the isolation experienced by desert-based small and medium-sized enterprises. Building on existing local initiatives and seizing the opportunities offered by a range of ICT, businesses are linked together to explore the benefits of networking, to identify possible synergies and opportunities for collaboration, to gain practical ICT and networking skills and confidence in the processes and create real outcomes for their business. Also, Antlova, Popelinsky and Tandler (2011) studied the long term growth of small and medium enterprises

(SME) from the perspective of ICT competencies and web presentations and found that some companies had developed significantly more ICT competencies than others and these competencies help them to be more successful and competitive.

The information and communications technology sector had been a pioneer and a powerful promoter in addressing the needs and interests of low-income communities in developing countries and for small and medium size firms, as mentioned before. But it was not always so. In the last decade of the twenty century and the first decade of the XXI century there was a self-conscious appreciation for the ICT sector's role in expanding economic opportunities (Kramer, Jenkins & Katz, 2007).

A number of factors distinguish the ICT sector in its potential to expand economic opportunity. First, its products and services enable individuals, firms, governments and other players to expand their economic opportunities as well as create such opportunities for others. Second, ICT companies know well that this dynamic is not automatic, but rather depends on a wide range of other factors and players. This interdependence has led them to take network or ecosystem strategies which often create large numbers of business opportunities for other smaller firms. Third, finally, underlying these ecosystem strategies are a fundamental collaborative capability and culture. Many firms have already begun to experiment ways of deliberately leveraging these attributes to expand economic opportunity. Others are beginning to think about the process.

The rate of technological innovation in ICT has accelerated dramatically and the sector today is much larger than it was 20 years ago. It also covers a more diverse universe of players than ever before. Today, the sector includes hardware, software, the Internet, telephony and content, application, and support service, provided by entities ranging from corporate giants to garage entrepreneurs or individual developers and open-source networks. Relevant content and applications are integral parts of the value proposition, and the "network effect" is crucial – technology only increases productivity when lots of people share access. As a result, collaboration has become a key business strategy. Twenty years ago, Moore (1996), has already argued that some of the largest and most successful firms have established themselves as "keystones" within vast "business ecosystems" in which independent partners, other firms, and even users provide content, applications, and services and, thereby, increasing the value of their technologies. Nowadays this evidence is even more true and obvious. Nowadays, such information and communications technologies allow to: (i) reduce transaction costs and thereby improve productivity, (ii) offer immediate connectivity – voice, data, visual – improving efficiency, transparency, and accuracy, (iii) replace more expensive means of communicating and transacting, such as physical travel, (iv) increase choice in the marketplace and provide access to otherwise unavailable goods and services, (v) extend the geographic scope of potential markets and (vi) channel all kinds of knowledge and information (Kramer, et al, 2007).In the context of a systemic challenge, the previous authors claim the collective investment and the collaborative implementation can be some of the most effective ways of achieving an organization's goals. ICT companies have enormous potential to leverage their collaborative

capabilities – using them in other contexts, with other types of collaborators – and to expand economic opportunity more widely in developing countries.

Acknowledging that ICT has become the foundation of every sector of every economy and the incredible diversity in the nature and size of firms in the ICT industry the present research study will focus on such firms – whether national, regional, or multinational.

1.3. The international projects for assess countries' business environment

Ghemawat (2007) vehemently argued that the world is not flat and showed how doing business in a foreign country is "confined" by cultural, administrative, geographic and economic conditions specific to the country. These differences may create opportunities but also increase the cost and risk of doing business in a foreign country by challenging the underlying business model. If the prevailing conditions discriminate against foreign firms they can constitute a real "liability of foreignness" which puts the firm at a competitive disadvantage *vis-à-vis* local firms (Zaheer, 1995).

So, in order to attract international investment every country wants to be assessed as a business attractive country. The attractiveness of a foreign country should fit the consistency of the foreign operations with the chosen strategic positioning and underlying activity system. From there, strategists should actively explore if a foreign expansion generates other advantages like the ones generated by differences in skills across countries or from buying services in several countries from the same supplier. As a result, the firm may gain from a more effective supply system and improved bargaining power. The spreading of activities across countries and its concentration in the best regions may generate benefits that clearly allow the firm to optimize the efficiency of its activities. This may happen, for instance, by concentrating activities in particular countries and exploiting economies of scale and scope, including the sharing of critical assets related to technology or marketing.

The attractiveness of a country needs to be expressed in several external demands and supply environmental factors. For instance: (i) the size of the market in the foreign country is an essential factor in achieving a large scale, (ii) the cost of labour in the foreign country, (iii) the image of the company or of its home country in the foreign country, related to differentiation, (iv) the absence of dominant rivals, in relation with the industry structure, (v) the correlation of the Gross Domestic product (GDP) of the foreign country with the GDP of other countries where the company sells the product which may present an analysis of normalizing risk; and, finally, (vi) the presence of strong knowledge institutes or high-tech clusters. Note that the attractiveness factors presented above only serve as a basic illustration of the possible attractiveness factors. A selection of factors for a particular case will require more fine-tuning to ensure that the selected factors unambiguously relate to the elements that help the firm to reinforce its core competencies and underlying activity system (Christos & Victoria, 2013).

A useful tool to consider the various strategic benefits from internationalization in line with Porter's approach (Porter, 1996) is the "ADDING Value Scorecard," proposed by Ghemawat (2007). The acronym "ADDING" stands for the extra value created through: adding volume, decreasing costs, differentiating benefits, improving industry attractiveness, normalizing risk, generating and deploying knowledge. Depending on the firm's strategy and trade-offs made, some elements will receive more weight. A country is attractive if it offers macro- or industry-specific conditions that are driving factors for the generation of these benefits (Porter, 1996). But there are other tools that can be useful (and are being used every day by firms that which to operate internationally) to assess a country's business environment. Such tools will be present in the following subsections.

1.3.1. Doing business

T To measure the environment in which businesses operate in countries across the world is the World Bank's Doing Business project, which was launched in 2002. At its core, this project gathers quantitative data to compare regulations faced by small and medium-size enterprises across economies and over time. The central piece of the project is the annual Doing Business report that was first published in 2003 with five sets of indicators for 133 economies. Currently includes 11 sets of indicators for 190 economies. The report includes a table that ranks each country in the world according to its scores across the indicators (Besley, 2015).

The economic activity requires sensible rules that encourage firm start-up and growth and avoid creating distortions in the marketplace. Doing Business focuses on the rules and regulations that can help the private sector. The project measures the presence of rules that establish and clarify property rights, minimize the cost of resolving disputes, increase the predictability of economic interactions and provide contractual partners with core protections against abuse The Doing Business data highlight the important role of the government and government policies in the day-to-day life of domestic small and medium-size firms. The objective is to encourage regulations that are designed to be efficient, accessible to all who use them and simple in their implementation. Where regulation is burdensome, it diverts the energies of entrepreneurs away from developing their businesses. But when regulation is efficient, transparent and implemented in a simple way, it becomes easier for businesses to innovate and expand. Indeed, Doing Business values good rules as a key to social inclusion.

Doing Business was designed with two main types of users in mind: policy makers and researchers. First, it is a tool that governments can use to design sound business regulatory policies even if the Doing Business data are limited in scope and should be complemented with other sources of information. Second, Doing Business is also an important source of information for researchers since it provides a unique data set that enables analysis aimed at better understanding the role of business regulation in economic development (World Bank, 2016). It is

To collect data, the project uses about 10,000 questionnaires with 11 topics that are answered in all engaged countries (Besley, 2015). Those topics are: (1) starting a business for measuring the procedures, time, cost, and minimum capital required to start a new business, (2) dealing with construction permits for measuring the procedures, time and cost required to build a warehouse, (3) getting electricity to measure the procedures, time, and cost required for a business to obtain a permanent electricity connection for a newly constructed warehouse, (4) registering property to measure the procedures, time and cost required to register commercial real estate, (5) getting credit to assess the strength of the legal rights, (6) protecting investors which measures the extent of disclosure and director liability and the ease of shareholder lawsuits, (7) paying taxes that measures the number of taxes paid, hours per year spent preparing tax returns and the total tax payable as a share of gross profit, (8) trading across borders that measures the number of documents, cost, and time required to export and import goods, (9) enforcing contracts that measures the procedures, time, and cost required to enforce a debt contract, (10) resolving insolvency to measure time, cost and percentage recovery rate involved with bankruptcy proceedings and, (11) employing workers which measure the ease with which workers can be hired or made redundant and the rigidity of working hours. For each of the 11 dimensions in the data, an aggregate score is created by taking a simple unweighted average of the ranks of the underlying indicators, which leads to a cross-country ranking within each of the 11 topics. To obtain an overall Doing Business aggregate ranking, the report calculates a percentile for each country for ten of the topics (the employing workers' category is excluded). These percentiles are aggregated to obtain the Ease of Doing Business ranking. This last one is the headline ranking that receives so much attention in media coverage (Besley, 2015).

1.3.2. Global Competitiveness Index

The World Economic Forum has been studying the competitiveness of nations for nearly three decades. Since 1979, an annual Global Competitiveness Report has examined the factors enabling national economies to achieve sustained economic growth and long-term prosperity (Sala-i-Martinet al.,2007). According with the previous mentioned authors, over the years the reports have served as benchmarking tools for business leaders and policymakers to identify obstacles to improved competitiveness, with the goal of stimulating discussion on strategies to overcome them.

The methodology used to assess national competitiveness has necessarily evolved over time taking into account the latest thinking on the factors driving competitiveness and growth. It was in this context that, in 2004, the World Economic Forum introduced the Global Competitiveness Index (GCI), a highly comprehensive index for measuring national competitiveness, taking into account the microeconomic and macroeconomic foundations of national competitiveness. According with the index, competitiveness is defined as the set of institutions, policies and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy. In other words, more competitive economies tend to be able to produce higher levels of

income for their citizens. The productivity level also determines the rates of return obtained by investments in an economy. The concept of competitiveness thus involves static and dynamic components: although the productivity of a country clearly determines its ability to sustain a high level of income, it is also one of the central determinants of the returns to investment, which is one of the central factors explaining an economy's growth potential (Sala-i-Martin et al., 2007). The index that attempts to measure global competitiveness includes twelve (12) pillars and every pillar has its sub-pillars. In total, the index includes 114 indicators grouped in three sub-indexes: (i) basic requirements, (ii) efficiency enhancers, and (iii) innovation and sophistication factors (Sala-i-Martin et al., 2016).

1.3.3. International Telecommunication Union

The rapid dissemination of information and communication technologies in all segments of society has created many opportunities to engage citizens in an increasingly digitally connected world. At the same time, the fast adoption of ICTs by citizens, organizations and governments poses new challenges for policymakers aiming to foster the ICT skills development required for success in today's digital economy while also ensuring digital inclusion across the population (ITU News, 2016).

Measuring the impacts of ICTs in society as well as monitoring how they are being used to promote sustainable development is essential to the design of effective public policies. The production of reliable statistical data to monitor the progress made by countries in promoting digital inclusion — and to measure the adoption of ICTs — is a crucial activity to guide policymakers' ICT growth strategies. Policymakers need high-quality data to underpin evidence- based policy decisions. Many countries and organizations — including National Statistical Offices, private companies and non-governmental organizations — have been increasing their capacity to produce specificity-related statistics to help policymakers craft better policies. However, some regions and countries still lack the ability to provide systematic and reliable ICT statistics. Most countries have been collecting and producing supply-side administrative data through ministries or regulators, which is very often insufficient for policy purposes. This is why the need for the production of harmonized, internationally comparable demand-side ICT statistics is being discussed at national and international levels. The ITU-led Partnership on Measuring ICT for Development (the Partnership) is an international multi-stakeholder alliance created in 2004 to address the challenges of ICT data collection and analysis. The Partnership plays a very important role in providing a harmonized methodological framework to measure 53 ICT core indicators, thereby reinforcing the international comparability of ICT data across countries (ITU News, 2016).

In this regard, ITU is leading an important process to develop statistical standards and internationally agreed methodologies to enable countries to measure the access to and use of ICTs. The ITU Manual for Measuring ICT Access and Use by Households and Individuals, for example, is a practical tool to guide countries in their ICT data production. It can be used as basic reference material when preparing, designing and implementing ICT household surveys. Another important role of ITU is the coordination

process at the international level of data collection, compilation and dissemination. Moreover, ITU has been offering capacity-building and technical support to Member States in the process of collecting and compiling ICT-related statistics (ITU News, 2016).

1.4. Environmental scanning process

Environmental scanning is the exploration phase of the strategic planning process. It is the systematic process of collecting and analysing information for the purposes of planning, forecasting, or choosing a preferred future. The environment of an organisation consists of the conditions, circumstances and influences which affect the organisation's ability to achieve its objectives. Broadly, an organisational environment consists of two elements – the internal and the external. There are three phases in strategic management, (i) environmental assessment, (ii) strategy development, and (iii) strategy implementation (RMIT, 2003).

Strategic environmental scanning aims at anticipating (long-term) environmental shifts and analysing their potential impact. Indeed, environmental scannings main function is to gather, interpret, and use pertinent information about events, trends, and relationships in an organization's environment that would assist management in planning the future course of action (Aguilar, 1967). There are two methods for implementing an environmental scanning: the reactive mode in which information is acquired to solve a problem, and the proactive mode in which the environment is scanned for upcoming changes that represent opportunities and threats (Fahey & King, 1977). More recently, according to Wheelen and Hunger (2006), environmental scanning refers to the monitoring, evaluation and disseminating of information (from the external and internal environments) to key people within a business corporation. This information is needed for decision-making

Bourgeois (1980) views an institution's or organization's engagement in an environmental scanning process, especially one that looks at the trends affecting the organization, as an essential component in developing a strategic plan. Bourgeois (1980, p. 31) identifies "environmental scanning as part of the secondary level of strategy making that results in risk assessment and "perception of uncertainty". Further, Bourgeois (1980) sees the environmental scanning process as a way to select and identify which "competitive weapons" give an organization its "distinctive competence".

As Morrison (1992) notes, in a traditional model of strategic planning, environmental scanning is classified as one of the activities that make up the external analysis conducted on the pathway to developing a strategic plan. Once this is combined with other externally focused activities and then merged with an internal analysis of an organization, strategies can be formulated. Environmental scanning specifically examines trends existing in the external environment that may affect an organization's core functions.

The environmental scanning helps to identify business opportunities and allows to analyse important information needed to assess countries, point important aspects related with different countries that are collected from different datasets and helps to compare them for further evaluation. This framework helps to analyse business context in different economies and for different sectors of activity like the case of the ICT sphere. Environmental scanning is one of the simple and quickest solutions to help in the process of decision-making for choosing a country where to develop future operations. This method is just, however, a first step in a more complex decision making business strategy.

Environmental scanning helps to analyse information needed to assess countries' business environment and presenting and comparing important aspects from different datasets. In the case of this research work it also helps to compare such different aspects for further evaluation at the ICT sphere. Environmental scanning allows to find best solutions in a decision-making process with the objective of choosing a country for implementing a business.

The scanning analysis can be carried out through the elaboration of grids and matrixes where the information collected will be included and compared. The elaboration of an informational grid allows to include in the analysis factors that the managers may consider important for their rea of activity, having in consideration the particular characteristics of a country.

In the classical so called "market-penetration grid" managers create three categories of variables. In the first category they may include what they consider to be acceptable (or unacceptable) variables for implementing a business. Immediately, after filling the grid, they can select which are the unacceptable countries and remove them from their lists of potential alternatives. In the second category of variables, the managers may use variables that show if a country presents good opportunities for business, such as: (i) direct costs, (ii) market size, (iii) tax rate, (iv) minimal investment size, among others. In the third category of variables they may use data related with the country's risk assess. For including this data, the managers could create a set of values and weight the variables, as they asses the risk weight of such a country. At the end, summing up all the results for each variable's category the managers will be able to rank first the countries that offer more opportunities (highest rank) and the ones that are riskier for the business (the ones in the lower ranking places). So, they will be able to compare among countries to choose the most business attractive country or countries (Daniels, et al, 2015). For a clearer understanding of the grid, the results can be plotted in a matrix.

These tools used in the environmental scanning allow to compare countries quickly, simple and easily.

2. Research Methodology

2.1. Objective of the study

Since the objective is to understand how the business environment and competitiveness of an economy allows the introduction of companies in the ICT sector, it is proposed to develop a scientific work which implements business environmental scanning that allows strategic planning of activities based on analysis and comparison of broad indicators of opportunities and efficiency for various countries. Environmental scanning is a process that systematically surveys and interprets relevant data to identify external opportunities and threats. An organization gathers information about the external world, its competitors and itself. The company should then respond to the information gathered by changing its strategies and plans when the need arises (Lapin, 2004).

The work tries to create a simple method for managers in the area of ICT to choose the best strategic location. The work offers a simple way to compare, examine and evaluate the countries. What can help, at first, the investors to use and have the quickest and cheapest (affordable) results. Since the work relates directly to ICT companies, special attention is given to for indicators and pillars that have connection with ICT. After choosing the potentially best tools in the ICT sector, since the main goal is the evaluation of the potential countries to invest in such a sector of activity, the classical comparison known as environmental scanning will be applied to analyse countries (Daniels, et al., 2015).

2.2. Description of Data Collection

2.2.1 Data collection for country comparison in ICT sector

Where that the objective is to implement an environmental scanning process, the idea is to create a grid with the most important indicators for a manager in ICT companies to decide the best location for his/her company. The method also gives the business managers, policy makers and researchers the possibility of saving time and money because it can be used without greatest knowledge. After environmental scanning, the managers and researchers can continue doing more global environmental analysis.

The environmental scanning method here applied gathers information based on three databases: (i) The Doing Business Indicators, (ii) The Global Competitiveness Index and (iii) The International Telecommunication Union's reports. The official websites of these databases are, respectively: (i) www.doingbusiness.org, (ii) www.weforum.org and (iii) www.itu.int the data collected refers to the year 2016.

Starting by the Doing Business Project, it is possible to observe from the data visible on the website, that the best country to a company to do business is New Zealand. In second, third, and fourth places are Denmark, Singapore, and South Korea. The worst economies to implement a business are Libya, Eritrea and Somalia. Countries like Portugal and Armenia are located in the 24thand 48thpositions, respectively. Concerning the Doing Business indicators, there are nonspecial indicators related directly with ICT companies. However, in this analysis it was decided to use five of the Doing Business indicators, which may be more important for ICT business than other. The selection of these indicators has been also driven by the work of several authors. For example, these indicators were used for research in ICT by Jerbashian and Kochanova (2016). These indicators are: (i) starting business, (ii) registering property, (iii) getting credit, (iv) protecting investors, and (v) paying taxes. Besides the previous indicators the following were also included: (i) Dealing with construction permits, (ii) Getting electricity, (iii) Enforcing contracts, (iv) Resolving insolvency.

The choice of the indicator that measures protecting investors is considered important, because it is assumed that investors and researchers from other countries need to enforce contracts. It was also noticed that countries that have a problem with this indicator they do not appear in the first. Finally, it is admitted that investors invest in countries and have something like insurance or other protection from their own country.

A second database used is the Global Competitiveness Index. Regarding this index, in first place is Switzerland. This country has the best rank in four pillars (i) 7th pillar: Labour market efficiency, (ii) 9th pillar: Technological readiness, (iii) 11th pillar: Business sophistication, (iv) 12th pillar: Innovation.

Finally, the third database used was the ICT Development Index (IDI). Regarding this index, it is possible to notice one difference regarding the two previous rankings. At a first look, it is possible to see that the

top 10 countries are the same, but from the eleventh place to 30th place, six small countries appear: city-countries like Luxembourg at 11thplace, Monaco at 19thplace, Malta at 24thplaces and Andorra, Macao, China and Bahrain from 27th till 29th places. Since these countries are very small, organizing their networks is very easy.

For the next step of the analysis, the ICT sector of activity was divided in three other sectors: (i) Research and Development (R&D), (ii) Production, and (ii) Services (or more commonly referred as Sales). To simplify, R&D includes companies that are occupied with R&D activities as well as programming companies, that create software products. Production includes all types of production related with ICT activities. Services include all types of products (equipment, programs, and services) sold by ICT companies.

Not all the indicators calculated by the three above datasets are important for an environmental scanning analysis in the sector of ICT. For this particular area of activity, managers look for particular aspects. Table 1 presents the indicators that are consider of important for analysis in a decision to expand internationally an ICT company. In the table, four columns are presented. The first column presents the indicator that should be considered in the analysis and the second column the source of the indicator (one of the three datasets mentioned above). Moreover, the third column presents the reason why the indicator may be important in a scanning process and the fourth column goes a little bit further offering the indication of which particular type of business (into the ICT sector) could be influenced by the indicator. The values calculated for the last available economic year will be used to calculate the average values that each country presents in the ICT sector, total, and for R&D, Production and Services subsectors inside the ICT sector, when the indicator applies.

Table 1. Identification of the indicators selected for the process of international environmental scanning in the ICT sector and respective explanation

Indicators (or pillars according with the GCI)	**Source**	**Argument**	**Type of business**
Starting a business	The Doing Business	Very important criteria are laid in this indicator: all necessary procedures for starting business, cost, time and many other assumptions about owners, business, etc.	R&D, Production, Services
Registering proper	The Doing Business	This indicator has been chosen for his main criteria: transfer property (buy and sell it).For having full rights and manage the business, it is important for managers to have full business rights.	R&D, Production, Services
Getting credit	The Doing Business	The friendly law for lenders and borrowers is substantially important at critical situations.	R&D, Production, Services
Protecting minority investors	The Doing Business	Usually companies have problems between managers and shareholders and if in some countries regulations or laws do not protect the minority investors then here are few investors who want to invest.	R&D, Production, Services
Paying taxes	The Doing Business	This indicator includes all types of taxes. And without knowledge of this aspect, the companies do not start their businesses.	R&D, Production, Services
Property rights	Global Competitiveness Report	The most exceedingly bad result by a wide margin happens when property rights truly are abolished.	Production
Electricity and telephony infrastructure	Global Competitiveness Report	A strong and huge telecommunications network permits a speedy and free flow of facts, which will increase typical financial performance via supporting economy actors taking into account all available applicable data to make sure that companies can communicate and are made decisions	Production
Availability of latest technologies	Global Competitiveness Report	This sub-pillar is important for ICT producers. For some producers a lower value is better, however because is important for the local market, it is important to look for a higher value.	Production
FDI and technology transfer	Global Competitiveness Report	This sub-pillar can be interesting, as it can show, that another firms are already investing and transferring the technology.	Production
Technological adoption	Global Competitiveness Report	This sub-pillar shows that the country has experience in getting the technology.	Production
IDI 2016 use sub-index rank	ICT Development Index	The sub-index show the producer useful information about (i) individuals using the Internet,(ii)fixed broadband subscriptions, and (iii)mobile-broadband subscriptions.	Production
Intellectual property protection	Global Competitiveness Report	“The strength or weakness of a country's system of intellectual property protection seems to have a substantial effect, particularly in high-technology industries. High-technology company considers setting up a subsidiary in a country without such protection." Mansfield (1995, p.7).For R&D companies this can be the most important factor to consider in the analysis.	R&D
Primary education	Global Competitiveness Report	To employ good staff in the future, companies need the country they which to develop their activities presents a good primary education. This sub-pillar consist of two elements: Quality of primary education and Primary education enrolment rate.	R&D

Source: Own elaboration using information retrieved from the websites of Doing Business (www.doingbusiness.org), Global Competitiveness Report (www.weforum.org) and ICT Development Index (www.itu.int).

Table 1. Identification of the indicators selected for the process of international environmental scanning in the ICT sector and respective explanation (continuation)

Indicators (or pillars according with the GCI)	Source	Argument	Type of business
Technological readiness	Global Competitiveness Report	R&D companies use new technologies, especially at ICT, so this pillar is very important for a scanning analysis.	R&D
Higher education and training	Global Competitiveness Report	The pillar shows: (i) quantity of education, (ii) quality of education, (iii) on-the-job training. All these factors are very important for R&D and programming, since this kind of activity requires a high qualified workforce.	R&D
Efficient use of talent	Global Competitiveness Report	This indicator shows the potential for R&D, to find and recruit talented workers.	R&D
R&D Innovation	Global Competitiveness Report	The indicator's name speaks for itself. This pillar consist of (i) Capacity for innovation, (ii) Quality of scientific research institutions; (iii)Company spending on R&D; (iv) University-industry collaboration in R&D; (v) Government procurement of advanced technology products; (vi) Availability of scientists and engineers; (vii) PCT patent applications.	R&D
IDI 2016 skills sub-index rank	ICT Development Index	This sub-index measures the gross secondary and tertiary enrolment in terms of schooling years.	R&D
Market size	Global Competitiveness Report	Knowing the market size can give to firms the information about expected sales.	Services
Individuals using Internet	Global Competitiveness Report	If firms can count their subscribers or quantity the use of equipment (products), they will know the size of their potential market.	Services
Fixed broadband Internet subscriptions	Global Competitiveness Report	Information about quantity and quality of internet users will also allow firms to understand the size of their potential market.	Services
Mobile broadband subscriptions	Global Competitiveness Report	This indicator is important for software companies and mobile device producers and sellers to know information about quantity mobile devices and mobile users to understand the size of their potential market.	Services
IDI 2016 access sub-index rank	ICT Development Index	The indicators shows access and infrastructures, i.e. ICT readiness, and allows to know information about expected sales.	Services

Source: Own elaboration using information retrieved from the websites of Doing Business (www.doingbusiness.org), Global Competitiveness Report (www.weforum.org) and ICT Development Index(www.itu.int).

After the selection of variables, indicators, and pillars from the three datasets chosen, a market-penetration grid and a matrix for the GCI pillars will be created to examine the countries under analysis. The above sources do not include directly indicators of risk assessment. However, the indicators and pillars show them indirectly, this is, the higher the value of the indicators and pillars, the lower the risk. Due to this restriction, it has been decided to change the factors of risk by factors that measure efficiency.

The market-penetration grid adopting the GCI pillars will be created using the following pillars are used as proxy variables to measure the business opportunity of an economy: (i) the GCI 3rd pillar that analysis the macroeconomic environment, (ii) the GCI 5th pillar that measures indicators related with higher education and training, (iii) the GCI 10th pillar regarding the market size, (iv) the GCI 11th pillar that measures the country business sophistication, and (v) the GCI 12th pillar that measures the degree of innovation in the economy.

As already mentioned, the risk evaluation was replaced by the efficiency evaluation, so the following GCI pillars are used as proxy variables to measure the business efficiency of an economy: (i) the GCI 1st

pillar that offers several indicators that analyse the efficiency of institutions, (ii) the GCI 2nd pillar that offers several indicators that analyse the economy's infrastructures, (iii) the GCI 6th pillar that measures the goods market efficiency, (iv) the GCI 7th pillar that measures the labour market efficiency, and, finally, (v) the GCI 9th pillar that includes indicators that measure the technological readiness.

2.3. Scanning analysis

There are many techniques to do a scanning analysis. A scanning analysis can be systematic, mathematical, judgmental, and intuitive, and the choice between the types depends on the information and/or data that is available. The data on which the scanning process relies is collected from reliable and international comparable sources of information – internationally formal world organizations such as the World Bank Group, the World Economic Forum, and the International Telecommunication Union.

The first step of the scanning process implies the calculation of data ranks that can be presents in tables. The ranks are calculated first to choose the possible investment countries. The datasets, nowadays, calculate indicators for almost all the countries in the world, however, this analysis will be centred in a minor set of countries – the ones that could be really interesting in the sector of ICT. Then will be observe the value that each selected country present for each one of the indicators (pillars) presented in Table 1, for the all ICT sector of activity and inside this sector, for the sub-sectors of R&D, Production and Services.

To evaluate countries, opportunity and efficiency dimensions were used in this research paper in order to rank countries. For a better visual representation, grids and matrices will be presented in the following sections.

3. Presentation and analysis of aesults

3.1. Country's selection for the scanning analysis

When using each one of the datasets mentioned in the previous section, a general index that ranks countries from the first place to the last one is presented. The countries that are presented in the top of the index are the best placed and the countries presented in the last places are the ones that perform worse. For example, if using the Doing Business Index, in the country that performs better is given the number 1 regarding doing business. Since the Doing Business Project analyses 190 countries, the number 190 is given to the country that performs worst. The other countries are located between these two numbers. Regarding the other two indexes, the behavior is similar.

Taking the explanation of the index ranks into consideration, Table 2 presents the ranking of each of the countries presented for each one of the datasets considered – Global Competitiveness Index, ICT Development Index and the Doing Business Rank. These ranks were calculated for the year of 2017 for the Doing Business, the 2016/2017 period of time for the Global Competitiveness Index, and for the 2016 year for ICT Development Index. The last column in the table presents the sum of the values found for each data set. The countries are listed from the smallest to the highest value of this last column, which gives what is called in this research work the scanning ranking of potential countries to operate an ICT business.

Table 2. Scanning rank for selection of potential countries for implementing an ICT companies.

Scanning rank	Countries	Global Competitiveness Index	ICT Development Index	Doing Business Rank	Sum
		(1)	(2)	(3)	(4)=(1)+(2)+(3)
1	Denmark	12	3	2	17
2	United Kingdom	7	5	6	18
3	Hong Kong SAR, China	9	6	5	20
4	Sweden	6	7	9	22
5	Singapore	2	20	3	25
6	United States	3	15	7	25
7	New Zealand	13	13	1	27
8	Norway	11	9	8	28
9	Korea, Rep	26	1	4	31
10	Germany	5	12	14	31
11	Switzerland	1	4	29	34
12	Taiwan, China	14	-	10	37
13	Finland	10	17	12	39
14	Netherlands	4	8	27	39
15	Iceland	27	2	18	47
16	Australia	22	14	13	49
17	Japan	8	10	32	50
18	Estonia	30	18	11	59
19	Ireland	23	21	15	59
20	Austria	19	23	18	60
21	Canada	15	25	20	60
22	France	21	16	28	65
23	Belgium	17	22	38	77
24	United Arab Emirates	16	38	34	88
25	Luxembourg	20	11	57	88
26	Czech Republic	31	32	26	89
27	Spain	32	26	33	91
28	Lithuania	35	39	21	95
29	Israel	24	30	49	103
30	Latvia	49	40	17	106
31	Malaysia	25	61	22	108
32	Poland	36	50	25	111
33	Portugal	46	44	24	114
34	Slovenia	56	33	30	119
35	Russian Federation	43	43	36	122
36	Italy	44	37	44	125
37	Bulgaria	50	49	37	136
38	Qatar	18	46	74	138
39	Bahrain	48	29	66	143
40	Chile	33	56	55	144
60	Armenia	79	71	43	193

Source: Own elaboration using information retrieved from the websites of Doing Business (www.doingbusiness.org), Global Competitiveness Report (www.weforum.org) and ICT Development Index (www.itu.int).

The countries that are not in rank; at least, in one of these three ranks has been automatically deleted from the list. After listing all the countries that were simultaneously in the three ranks, 81 countries could be considered. However, the list was too long to be presented so just half of the countries (40 countries) have been considered. Additionally, Armenia (which sum puts the country in the 60th place) has also been taken under analysis. Therefore, 41 countries will be considered in the scanning process to understand which are the best and the worst ones to create an ICT business – a R&D company, a production company or just an ICT services company.

The rank that results from the sum of the three original ranks allows selecting a set of countries that may be considered to implement a new business in the ICT sector of activity. From the values presented in the Table 2 it is possible to understand developed countries are listed that at the top 20 of the scanning rank. For example, Denmark is at the top in the ranking when 'sum' column is looked at, although the country is not in the first place in any of the presented ranks. However, Denmark holds a very good position (rank) in the ICT Development index and Doing Business rank which makes it the best country to operate ICT business in, considering the three datasets selected.

As can be observed from the table, there are small differences between the countries that are ranked first, thus it can be expected that these countries will compete for the leading position in the future. Still, more in-depth analysis is needed for any of these countries in order to understand their attractiveness for investments in the ICT sector.

Moreover, all four big Asian economies – so-called Asian Tigers (South Korea, Singapore, Hong Kong, and Taiwan) – are represented in the list of selected countries, as well as some Arabic oil-rich countries

It is also possible to observe in Table 2 which countries present problems with the governmental institutions, competitive advantages and ICT sector in general, even though these assumptions are just relative since the list contains only countries with high ranks in each one of the three datasets. For example, Estonia is in the 30th place in the Global Competitiveness Index. This may indicate the existence of some problems regarding the competitive advantages of the country and a lower level of attractiveness among all the other countries. Nevertheless, it should be pointed out, that Estonia is an a relatively new economy since it withdrew from the USSR and gained independence only in 1991. The country has its problems regarding demography, salaries, unemployment rates etc. Still, it already improved a lot in terms of business regulations (11th place in Doing Business Rank) and ICT development (18th place in the corresponding index). Thus, ICT sector can be considered as good and attractive for further investments which can serve as a catalyst for the growing of the country's economy.

It can be seen from Table 2 that Portugal has normal laws and rules, the government works well. Portugal is a little behind in competitiveness and ICT ranks in comparison with other developed countries. However, Portugal is in top 40 the list of countries and further analysis can be done.

Although Armenia is out of the top 40 (it has 60th ranking position), it is included in the analysis. Armenia implements certain actions in order to easy doing business procedures; however, the competitiveness and ICT development rankings are worse.

In the Table 2, Qatar and Chile have the last 2 positions, but it does not mean that they are worse, in their regions they are in avant-garde. But they still need to work to reach developed countries.

The next section is devoted to an analysis of different types of businesses in the ICT sector: R&D, Production, and Services (where Sales are included).

3.2. Implementation of the scanning process

The scanning process, presented in this section, is based on information that were collected and presented at Table 1. This is the information considered for doing the scanning analysis is the one that can be collected in the three datasets for the indicators selected.

The information from the Global Competitiveness Index (GCI) regards the period of 2016/2017. The information of all the pillars selected will be used to analyse possible investments in ICT - R&D, Production and Services – as it seems more appropriate. Companies in the R&D sub-sector will be more interested in the following GCI pillars and sub-pillars: (i) the sub-pillar 1.02 related with the intellectual property protection, (ii) the GCI sub-pillar 9.01 that measures the availability of latest technologies, (iii) the GCI sub-pillar 9.03 that measures the Foreign Direct Investment (FDI) and the technology transfer, and (v) the GCI general 9th pillar that offers indicators related with the technological readiness. For analyses of the sub-sector of production ICT companies, the research will use the following Doing Business and GCI indicators, pillars and sub-pillars: (i) the Doing Business indicator that gives indications about the property rights, (ii) the Doing Business indicators that offers information about electricity and telephony infrastructures, (iii) the GCI sub-pillar 9.01 that indicates the values of availability of latest technologies, (iv) the GCI sub-pillar 9.03 that, as already indicated, measures the FDI and technology transfer, and, finally, (v) the GCI sub-pillar 9.01 that presents indicators related with technological adoption. To conclude, for the scanning process applied to the subsector of services, inside the ICT sector, the work uses the following GCI pillars and sub-pillars: (i) the GCI 10th pillar that offers indicators about the market size, (ii) the GCI 9.04 pillar that indicates how many individuals are using Internet, (iii) the GCI sub-pillar 9.05 that presents the number of fixed broadband Internet subscriptions, (iv) the GCI sub-pillar 9.07 that presents the number of mobile broadband subscriptions, and, finally, (v) the GCI sub-pillar 9.02 that measures the use of ICT.

To conclude, is also used information taken from the ICT Development Index, in particular 3 sub-indexes: the IDI 2016 skills sub-index rank for applying in R&D companies, the IDI 2016 use sub-index rank for applying in production companies, and the IDI 2016 access sub-index rank for applying in the services companies.

Table 3 below, was built by using the environmental scanning technique, as Table 2 above, and presents the results of the countries' ranks for the R&D, Production, and Services companies (in the ICT sector) that are calculated using arithmetic averages. The information used for calculating ranks and its importance for each of three sub-sectors is explained in the Table 1 and in the previous sentences. Countries are ranked according to the results obtained for Table 2 in order to be able to compare each sub-sector's rank with the initial one for the ICT sector of activity as a whole.

Note, that usually for this method of evaluation researchers and investors may need more information about indicators, pillars and indexes and their impacts. However, this research work aims to create a simple method for such evaluation that can be quickly and easily used by others.

Table 3. Scanning rank for selection of potential countries for implementing R&D, Production, and Services ICT companies

Rank (Table 1)	Economy	R&D				Production				Services				Total
		DB	CGI	IDI	Rank	DB	CGI	IDI	Rank	DB	CGI	IDI	Rank	Rank
17	Denmark	7	13	6	2	7	22	1	6	7	7	14	4	2
18	UK	8	6	29	9	8	4	9	1	8	1	3	1	1
20	Hong Kong	5	20	33	16	5	10	12	4	5	12	4	2	5
22	Sweden	16	9	30	14	16	5	6	3	16	6	13	7	7
25	Singapore	3	3	56	18	3	2	19	2	3	15	11	5	6
25	United States	19	14	1	4	19	11	18	12	19	10	19	11	12
27	New Zealand	1	8	8	1	1	19	11	7	1	16	17	6	3
28	Norway	15	5	9	3	15	9	4	5	15	11	22	10	4
31	Korea	12	31	3	11	12	35	3	15	12	3	8	3	11
31	Germany	57	10	23	25	57	15	21	24	57	5	5	18	20
34	Switzerland	46	1	31	20	46	1	2	13	46	4	9	16	17
37	Taiwan	17	23		17	17	26		19	17	19		15	18
39	Finland	22	2	10	6	22	18	7	10	22	13	39	22	15
39	Netherlands	29	4	12	10	29	6	15	14	29	9	7	9	13
47	Iceland	18	11	20	13	18	23	5	9	18	25	2	8	8
49	Australia	14	18	2	5	14	24	16	17	14	14	21	12	14
50	Japan	60	16	35	32	60	14	8	21	60	2	10	21	22
59	Estonia	11	22	15	12	11	27	14	16	11	29	27	17	16
59	Ireland	9	12	16	8	9	13	23	8	9	22	23	14	10
60	Canada	4	15	17	7	4	17	26	11	4	18	28	13	9
60	Austria	47	17	21	22	47	21	30	26	47	24	15	23	24
65	France	51	19	36	30	51	20	17	22	51	8	12	20	21
77	Belgium	70	7	26	29	70	12	24	31	70	20	16	29	30
88	Luxembourg	87	24	70	56	87	3	10	27	87	21	1	31	35
88	UAE	23	27	105	44	23	8	27	18	23	23	24	19	27
89	Czech R.	35	26	27	23	35	31	31	25	35	27	43	28	25
91	Spain	40	35	19	26	40	37	25	28	40	17	31	24	26
95	Lithuania	13	30	13	15	13	36	33	20	13	34	54	26	19
103	Israel	56	21	22	27	56	7	42	29	56	33	18	30	28
106	Latvia	10	37	32	21	10	46	37	23	10	45	45	25	23
108	Malaysia	31	28	94	43	31	28	46	30	31	39	66	40	37
111	Poland	36	42	24	28	36	56	59	40	36	38	53	37	34
114	Portugal	44	29	47	33	44	25	51	34	44	37	30	32	31
119	Slovenia	34	32	7	19	34	43	49	35	34	50	29	33	29
122	Russia	24	51	14	24	24	89	45	44	24	30	49	27	32
125	Italy	63	40	41	40	63	57	38	45	63	26	38	38	38
136	Bulgaria	45	59	34	39	45	59	47	41	45	42	59	48	39
138	Qatar	81	25	88	62	81	16	35	37	81	32	33	47	52
143	Bahrain	53	38	71	47	53	33	22	32	53	31	32	34	36
144	Chile	61	44	25	36	61	32	64	43	61	54	61	58	46
	Armenia	25	87	60	54	25	74	85	58	25	87	70	59	64

Source: Own elaboration using information retrieved from the websites of Doing Business (www.doingbusiness.org), Global Competitiveness Report (www.weforum.org) and ICT Development Index (www.itu.int).

It can be observed in Table 3 which country is better for operating in R&D (Rank R&D), Production (Rank Production) and Services (Rank Services) in the ICT sector of activity. These ranks can be compared with the initial rank obtained in Table 2 for the ICT sector as a whole (the column called Rank (Table 1)). The inclusion of this column intends to compare the position a certain country has in each of these sub-sectors and whether it differs (or not) from the whole ICT sector.

As an example, United Kingdom (UK) and New Zealand can be compared. It is seen from the previous table that, in total, for these three sub-sectors, UK is located in the first position and New Zealand has the third one. However, if only R&D rank is taken into consideration, New Zealand occupies the first position and UK is just on the ninth one. If ranks for Production and Services are looked at, New Zealand is located on seventh and sixth positions, respectively, while UK is located first for both these ranks. At the same time, if the initial rank from Table 2 is analysed and compared with the total rank for the three sub-sectors, UK has the second position while New Zealand is on the seventh one. This difference is due to the fact that the ICT sector does not consist only on these three sub-sectors, and there are more pillars and sub-pillars in the rankings that can be used for evaluation and were not considered in the present research.

If the Services Rank for Sweden and Germany are compared, Sweden presents a better result - seventh position against the eighteenth position for Germany. However, if each ranking index is taken separately, for CGI and IDI Services, Germany goes up to the fifth position, while Sweden just ranks in the sixth and thirteenth positions, respectively. Only for the Doing Business project, the Services in Sweden perform better – Sweden has the sixteenth position against the fifty seventh' position obtained by Germany, from this analysis it could be said that Germany presents more strong and robust rules than Sweden in terms of business regulations.

It is also important to compare the two countries which are located in the first two positions: Denmark and UK. As can be seen from Table 2, Denmark ranks first, closely followed by UK. However, in Table 3 they switch places. The reason could be because in Table 2 indicators for the ICT sector as a whole were used, while in Table 3 only indicators which are chosen and presented in Table 1 are taken into account.

Portugal rises from position 33 to position 31 place in the total rank calculated for the three considered sub-sectors if compared to the initial ranking. This indicates that Portugal has a stable position in all ICT sub-sectors, here considered, as well as normal and stable rules regarding the business environment and it is competitive, even if is not in the top-25 of the countries considered. A little bit lower in the rank is located Armenia. The country ranks in a position near the 60th place if whole the ICT sector of activity is taken into consideration. However, in the R&D rank the economies situation is slightly better with the country ranking in the 54th place in the list.

In addition, it is also important to indicate three northern European countries – Norway, Sweden, and Finland – as well as their nearest neighbour countries – Estonia, Lithuania, and Latvia. It is natural, that all three north countries are the top, but Estonia and Lithuania together in top 20 countries and Latvia at 23thplaces. These three countries have worked for many years on the development of their countries and have made considerable progress. Estonia locates in R&D in 12th place, in Production locates in the 16th place and in Services is located in the 17th place of the full list. Estonia was the smallest of them and was able to achieve more.

Comparing positions of the top 40 countries (Table2 vs Table3) it can be seen that positions are almost identical - they only slightly differ by one or two points. Only five countries strengthened their position in the ranks Canada improved is location in twelve positions, Lithuania nine positions, Iceland and Latvia seven positions and Slovenia five positions. At the same time, three countries fell in the rating: Luxembourg felt ten positions, Belgium felt seven positions, and Malaysia six positions.

If Table 2 and Table 3 are compared, almost all countries remained from Table 2 to Table 3 and only Qatar went out from the list presented in Table 3. Slovakia appeared at the thirty-third position, for the first time, in the total rank of Table 3. Thus, using the indicators and pillars that were considered important to scan a country regarding the implementation of ICT comparison does not change the overall alignment of each country compared with others, as for each rank for ICT sectors especially suitable indicators, sub-indexes, pillars, and sub-pillars are used.

The choice of indicators and pillars may be criticized, and some others pillars, indicators or indices may be used for the analysis. However, in this particular study, the intention was the creation of a simple method for evaluating countries according with the perception of the author that relies on previous research and literature. It is obvious that any researcher or interested party can use any tool and indicators/indices that are considered more important for them. However, in the case of this research the results show that the overall picture does not change which indicates the right choice of data.

3.3. Countries comparison by grids and matrices

This section aims to analyse countries in terms of their opportunities to business and country's efficiency. The more traditional environmental scanning method has been used to build Table 4, which is presented below. Data from the Global Competitiveness Index has been used for this analysis. As these data do not contain the information regarding risks, this dimension has been changed to efficiency assessment, as explained before. Opportunities include: macroeconomic environment, higher education and training, market size, business sophistication, and innovation. At the same, time efficiency is considered in terms of institutions, infrastructure, goods market efficiency, labour market efficiency, and technological readiness. Values for each of these pillars were taken from the Global Competitiveness Index and present the real published figures. The sums for opportunities and efficiency are calculated by simple summation of figures for each pillar. The higher the value, the better the country performs in terms of these dimensions. Countries in Table 4 are ranked according to the total values for both opportunities and efficiency, from the highest one to the lowest one. The table, however, presents results not only for the ICT sector of activity, but for business as a whole. Nevertheless, pillars, Innovation and technological readiness directly point to the ICT sector.

In (Table 4nsider 5 countries with big markets were considered: (1) China, (2) India, (3) Brazil, (4) Mexico and (5) South Africa, since one of the indicators considered to calculate the values presented in the table corresponds to the pillar that measures the market size. China and the other big countries are not included in Table 2 and Table 3, since these countries are not at the top-40 of countries there listed.

Table 4. Market-penetration grid.

Country/Indicator	3rd pillar: Macroeconomic environment	5th pillar: Higher education and training	10th pillar: Market size	11th pillar: Business sophistication	12th pillar: Innovation	Sum for opportunities	1st pillar: Institutions	2nd pillar: Infrastructure	6th pillar: Goods market efficiency	7th pillar: Labour market efficiency	9th pillar: Technological readiness	Sum for efficiency	Total
	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	value
Switzerland	6.45	6.03	4.63	5.80	5.80	28.72	5.89	6.24	5.42	5.95	6.41	29.91	58.63
Singapore	6.15	6.29	4.70	5.18	5.33	27.65	6.10	6.50	5.78	5.80	6.14	30.31	57.96
Netherlands	5.74	6.07	5.05	5.61	5.44	27.91	5.70	6.37	5.41	5.07	6.18	28.72	56.63
United States	4.62	5.91	6.90	5.62	5.64	28.68	4.96	5.94	5.21	5.48	6.02	27.62	56.30
Hong Kong SAR	6.18	5.66	4.77	5.20	4.40	26.22	5.73	6.69	5.71	5.60	6.21	29.94	56.15
Germany	6.03	5.63	5.99	5.64	5.58	28.87	5.16	6.06	4.97	4.80	6.11	27.10	55.97
Sweden	6.33	5.63	4.60	5.59	5.49	27.64	5.94	5.58	5.29	4.86	6.29	27.96	55.60
United Kingdom	4.40	5.54	5.72	5.58	5.03	26.27	5.55	6.04	5.34	5.46	6.33	28.71	54.98
Norway	6.84	5.94	4.37	5.37	5.05	27.57	5.89	4.93	5.05	5.25	6.17	27.30	54.87
Japan	4.10	5.38	6.06	5.72	5.43	26.69	5.45	6.29	5.20	4.85	5.81	27.59	54.29
Denmark	5.93	5.95	4.21	5.42	5.13	26.63	5.49	5.56	5.07	5.08	6.10	27.30	53.93
United Arab Emirates	5.28	5.07	4.93	5.25	4.57	25.10	5.82	6.31	5.61	5.17	5.82	28.74	53.83
Finland	5.14	6.16	4.10	5.25	5.68	26.34	6.13	5.34	5.06	4.78	5.97	27.29	53.63
Qatar	6.72	5.14	4.29	5.20	4.87	26.22	5.70	5.64	5.41	5.00	5.35	27.10	53.32
New Zealand	5.99	5.89	3.86	4.83	4.63	25.20	6.01	5.33	5.31	5.43	6.03	28.10	53.30
Taiwan, China	6.12	5.61	5.18	5.03	5.07	27.00	4.82	5.80	5.20	4.77	5.53	26.12	53.12
Canada	5.22	5.54	5.42	4.87	4.61	25.66	5.37	5.70	5.10	5.34	5.79	27.31	52.97
Luxembourg	6.22	4.78	3.21	5.21	4.93	24.34	5.76	5.66	5.54	5.03	6.40	28.38	52.72
Ireland	5.20	5.70	4.27	5.20	4.81	25.19	5.59	5.24	5.43	5.13	6.05	27.43	52.62
Austria	5.45	5.76	4.53	5.50	5.03	26.28	5.23	5.77	4.90	4.53	5.72	26.14	52.42
Belgium	4.84	5.99	4.75	5.35	4.97	25.90	5.21	5.46	5.22	4.49	5.99	26.38	52.28
Australia	5.69	5.91	5.10	4.74	4.55	26.00	5.32	5.65	4.82	4.69	5.66	26.14	52.14
France	4.73	5.46	5.74	5.22	4.92	26.07	4.90	6.12	4.71	4.42	5.92	26.07	52.13
Korea, Rep.	6.58	5.32	5.51	4.87	4.75	27.02	4.02	5.96	4.93	4.14	5.54	24.59	51.62
Israel	5.10	5.38	4.21	5.10	5.73	25.52	4.78	5.30	4.71	4.80	5.76	25.34	50.86
Malaysia	5.43	4.96	5.03	5.16	4.72	25.29	4.97	5.42	5.25	4.77	4.81	25.22	50.51
Iceland	5.53	5.88	2.31	4.77	4.73	23.23	5.43	5.59	4.74	5.21	6.17	27.14	50.37
Estonia	6.13	5.54	3.00	4.26	4.05	22.98	5.11	4.98	5.06	5.03	5.35	25.55	48.53
China	6.19	4.64	7.00	4.41	4.04	26.28	4.30	4.71	4.43	4.53	3.96	21.92	48.20
Spain	4.33	5.14	5.39	4.54	3.76	23.16	4.14	5.85	4.45	4.25	5.61	24.31	47.47
Czech Republic	5.89	5.20	4.43	4.49	3.78	23.79	4.16	4.68	4.67	4.50	5.54	23.55	47.35

Source: Global Competitiveness Index, (www.weforum.org).

Table 4. Market-penetration grid (continuation)

Country/Indicator	3rd pillar: Macroeconomic environment	5th pillar: Higher education and training	10th pillar: Market size	11th pillar: Business sophistication	12th pillar: Innovation	Sum for opportunities	1st pillar: Institutions	2nd pillar: Infrastructure	6th pillar: Goods market efficiency	7th pillar: Labour market efficiency	9th pillar: Technological readiness	Sum for efficiency	Total
	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	value
Lithuania	5.44	5.25	3.53	4.28	3.75	22.25	4.21	4.65	4.64	4.37	5.59	23.46	45.70
Portugal	3.69	5.04	4.28	4.24	3.91	21.16	4.30	5.48	4.66	4.31	5.59	24.33	45.49
Italy	4.19	4.90	5.58	4.84	3.93	23.43	3.47	5.40	4.34	3.64	5.03	21.88	45.31
Bahrain	3.88	4.90	3.23	4.42	3.61	20.03	5.04	5.01	4.98	4.55	5.15	24.73	44.76
Slovenia	4.91	5.42	3.32	4.23	3.93	21.81	4.10	4.79	4.62	4.08	5.19	22.78	44.59
Poland	5.14	5.03	5.13	4.10	3.39	22.79	3.99	4.34	4.57	4.13	4.76	21.79	44.58
South Africa	4.52	4.22	4.89	4.52	3.85	21.99	4.46	4.18	4.77	3.94	4.70	22.06	44.05
Russian Federation	4.30	5.09	5.90	3.85	3.40	22.54	3.63	4.87	4.19	4.43	4.30	21.42	43.95
Latvia	5.56	5.01	3.15	4.06	3.36	21.14	4.00	4.38	4.52	4.57	5.20	22.67	43.81
India	4.55	4.12	6.43	4.39	4.05	23.54	4.36	4.03	4.39	4.10	2.99	19.87	43.41
Kuwait	6.31	3.98	4.28	4.02	2.96	21.54	4.10	4.36	4.20	3.67	4.33	20.66	42.20
Slovak Republic	5.28	4.54	3.99	4.10	3.32	21.24	3.48	4.24	4.45	3.98	4.79	20.94	42.18
Mexico	4.98	4.12	5.64	4.24	3.41	22.39	3.30	4.26	4.33	3.85	3.97	19.71	42.10
Brazil	3.49	4.11	5.73	4.01	3.10	20.43	3.24	3.98	3.70	3.67	4.37	18.95	39.38
Armenia	4.31	4.38	2.68	3.75	3.20	18.32	3.99	3.77	4.59	4.40	4.01	20.75	39.07

Source: Global Competitiveness Index, (www.weforum.org)

Table 4 and Figure 1 (that graphically illustrates the figures presented in Table 4) allow to understand, why some countries are in the beginning of the list and others are at the bottom. In Figure 1, X-axis shows the opportunities and Y-axis show efficiency. Looking at the axis, researchers and business managers can analyse which countries offer good opportunities and weighty efficiency

For an easier perception, it is possible to observe the comparison between US and Germany. For these countries the values of pillars do not present a big difference in value weights. However, when comparing US and China, US presents better values in most cases. China only presents a bigger market and has a better macroeconomic environment. Indeed, China presents, for example, more opportunities than Estonia but has less efficiency, so in this rank China is behind Estonia.

Italy is present in all tables and ranks, but did not appear in the top twenty – it is positioned behind Portugal, for example. In the total sum of opportunities and efficiency, Armenia is behind its competitors. However, after looking at Figure 1, it becomes clear that Armenia is more efficiency than big markets as Brazil, Mexico or India.

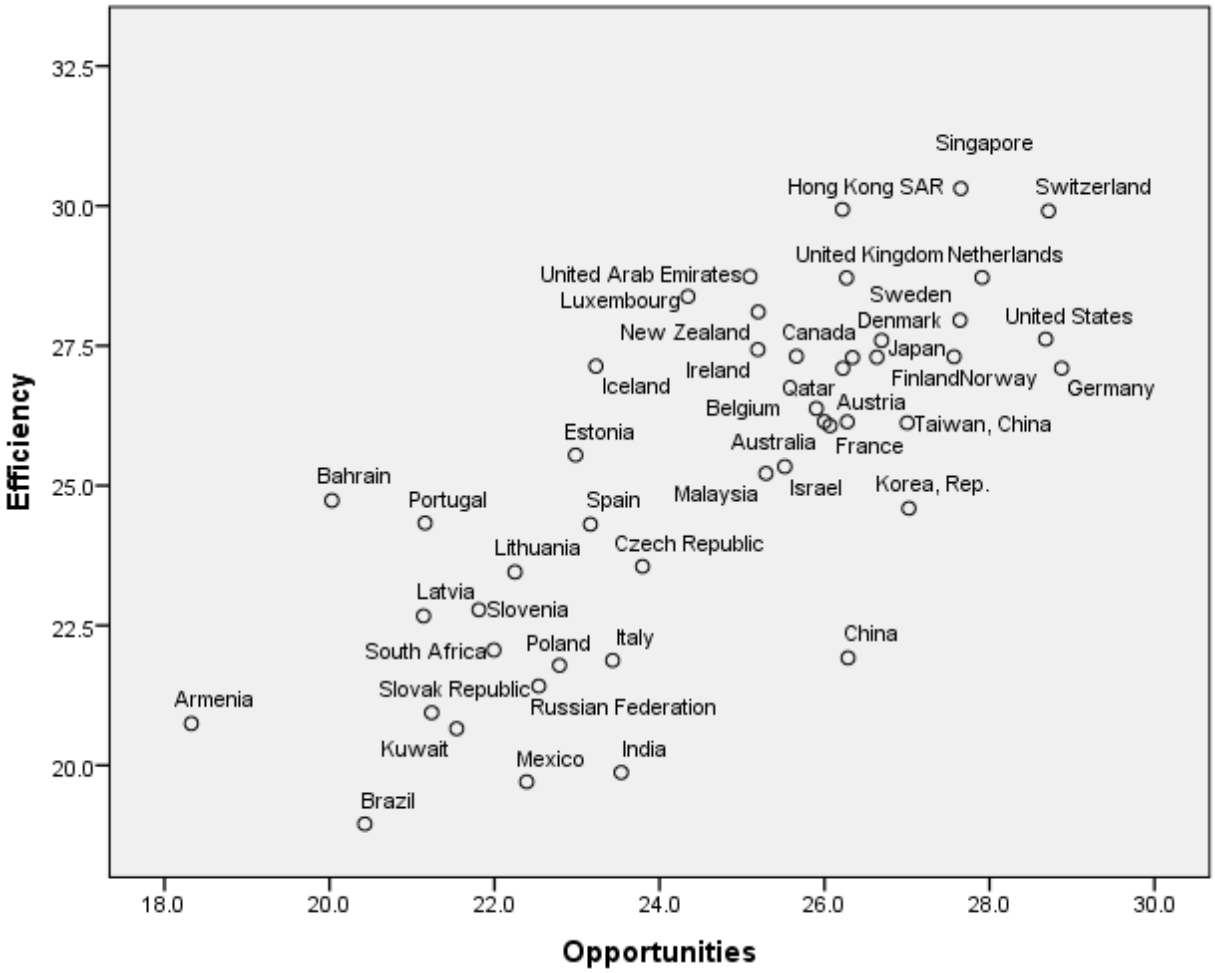

Figure 1. Market penetration matrix

Source: Global Competitiveness Index, (www.weforum.org)

At a first sight it can be observed in the Figure 1 that there is no single country that performs much better than the others both in terms of efficiency and providing opportunities for business. For example, Singapore has the highest level of efficiency but it is not the best considering opportunities. It can be viewed as an attractive market in terms of investments, in particular in the ICT sector. The same can be said for Hong Kong, Switzerland, UK, Sweden or the Netherlands. At the same time, countries there are at the left side bottom of the figure can be considered as not so appealing.

For robustness test, five countries not included in the initial list – Brazil, China, India, Mexico, and South Africa – were included in the analysis. Results prove that big markets are not necessarily a requirement regarding competitive advantages. All these countries do not provide enough opportunities and present even less efficiency that those that were included in the initial analysis.

The matrix in Figure 1 shows that two “oil countries” appear in good positions: United Arab Emirates and Qatar. UAE presents more efficiency than many developed countries. This also shows that in future UAE will try to improve it position in the rank and be more attractive for investments than other countries. China presents good opportunities but less efficiency which means that has to work on this direction, as Italy, Poland or Russian Federation.

Using Table 2, Table 3, Table 4, and Figure 1, researchers and investors can have an idea which country is better for investments, select the country with the best ICT sector, and understand where there are problems and more thoroughly study the problems.

Conclusions, limitations and future research lines

The main objective of this research was to evaluate countries in terms of their attractiveness to business and investments in the ICT sector, in particular, and to create a list of countries with the most competitive advantages for companies operating in such sector.

To achieve this purpose, a traditional environmental scanning method was used. Data for the analysis was gathered from three main sources or databases: Doing Business Indicator, Global Competitiveness Index and ICT Development Index. Theoretical framework for all concepts used in research was presented in the first part of this paper, using the most recent literature.

The analysis allows to present the following results. First of all, it was possible to create a list of 40 countries that ranks the best among others in terms of attractiveness of investments into ICT sector of activity. In addition, Armenia was also added to the list, although it had 60th position. Denmark, United Kingdom, Hong Kong, Sweden, and Singapore are the top-five countries to invest in ICT. Secondly, ICT sector was divided by three sub-sectors: (i) R&D, (ii) Production, and (iii) Services in order to evaluate the countries in terms of each of these sub-sectors and compare them with results for the whole ICT sector. Results showed that the overall picture does not change much, country's positions shift only by one or two points. Only Qatar was dropped from the list, and Slovakia entered. The study also provides insights in country's efficiency and opportunities for business using data from the Global Competitiveness Index. The established matrix allows to observe which countries provide better opportunities for business, which are more efficient, and which perform well in both dimensions.

Like any other research, this study suffers from some limitations. Firstly, it was not possible to collect ranking information concerning countries' economic risks, especially in ICT sector; thus, it was decided to change risks for efficiency (as the absence of risk). Second, indicators that were used for sub-sectors analysis were chosen based on own perceptions that can differ from that of other researchers.

It is believed that these limitations can be overcome in future works that may include usage of vaster databases as well as information regarding risks which is an essential dimension when speaking about investments.

However, this work presents certain value to this field of study as it offers a simple tool for analysing countries and sector of economic activity using existing databases. Developed method can be used for analysis of different types of information in different fields of research.

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