

Comparative Analysis Of Ict Performances Of Turkey And Bosnia And Herzegovina By Custom Scorecard Model

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Abstract: Information and Communication Technologies (ICT), being commonly used in all the sectors of an economy and one of the most important driving forces for social development in the last 20 years, facilitated to product goods and service for producers. Besides that, ICT has been begun to substitute other production factors, by reason of being cheaper of communication tools such as computer or internet and the changes observed in these tools. As it is looked consumers' perspective, falls of the prices and the high performance in these technologies reasoned in being used of them in every moment of daily life.

The main purpose of this study is to compare the ICT performances of Turkey and Bosnia Herzegovina, based on the data set of the World Bank. KAM'S Custom Scorecards model developed by the World Bank has been used in the study. As a result of the analyses, it has been found that Turkey has delivered a better performance in general than Bosnia Herzegovina has done, except for the variables of Internet Users and Price Basket for Internet.

Keywords: ICT, Custom Scorecards, Turkey, Bosnia And Herzegovina

1. Introduction

Nowadays, information stored or newly generated in any place in the world are transmitted to corporations located in another locations by means of ICTs. In economic concept that approach defined as externality creates opportunity for organizations which fails to generate information to provide welfare as operators. So it creates support for the productivity of organizations (Saygılı, 2003:100). Further to rapid fall in the prices of computer and similar technological communication devices applications and expansions of ICT earned acceleration. As the natural outcome of that circumstance, ICT devices regularly and in significant level have been substituted instead of classical production factors such as labor and capital (Dursun and Vardareri, 2007:76).

Intense and fast sophistications in ICT deeply affected economic and social life. That occlusion presently keeps its influence in increasing amount dynamically. ICT emerging as the indispensable component of public life connecting producers, consumers and state on a network setting moved economic operations related to goods and services to electronic environment. That related process operating in a different situation compare to traditional economic activities, enabling markets to possess transparent structure availed cost advantages in the production of plenty of goods and services. Rapid expansions in ICT resulted in consumer satisfaction.

Technological innovations transforming socio-economic life styles and cultural forms are considered as the discoveries of paper, printing house, telegram, steam machine, computer and internet. Discovery of paper and printing house while leading to expansions of information accumulation owned by mankind, discovery of steam machine has been a corner stone for the domination of mankind to element and mankind commenced to apply those mechanical settings instead of living tissues as production and transportation purpose. Telegram, telephone, telex, computer and internet communication devices applied by humans created transformation in

time and location perceptions and by means of ICT devices data flow accelerating in an extraordinary way led to widespread of innovations in various field (Yücel, 2006:6). ICT facilitating education and business life, enabled fast and productive communication emerged newly arising professional fields, eliminating some of the monotonous occupations.

Rapid advancements in the field of ICT developed a new dimension in competition. Competitive force based on cheap labor and natural resources has been substituted by technological manufacturing processes adequately strong to compete in international markets. Corporations are providing increasing gains from ICT in their competition (Nelson, 2006). Those organizations applying advanced technologies are also providing great utilities in competitive power. In line with those developments, globalization in competition motivates organizations to intensify their investments in information, qualified staff and information technologies. Because most fundamental features in competition are concentrated on information.

Eventually, ICT devices transform the world into a great village. At the present time, none of the transformations remain in domestic and national limits. Development or a method in some where on earth easily affects firms established in some other pars. Corporations for avoiding negative impacts from the advancements and to foresee the sophistications earlier and to gain information about those developments obliged to make adaptations (Ekinci, 2006: 56).

2. Summary Of Literature

About the overall performances of ICT studies in literature interrelations between production, value added and productivity performed by ICT after 1990 have been investigated. Even though there is no consensus, ICT is found creating great effect in economic growth enabling productivity rise (Jorgenson and Stiroh 2000; Scarpetta, et. Al. 2000; Oliner and Sichel, 2000).

Empirical analysis, for example, long term productivity rise after the second part of 1990s indicates that approximately half of the productivity rise experienced two folds was originated from ICT sectors (Oliner and Sichel, 2000: 11).

At the corporate level in executed lots of studies, a statistically positive correlation was found between ICT and productivity. Because, investigation at corporate level allows to measure the ICT's impact over the quality and diversification of manufacturing process. However, excessively combining the data may mask those effect (Dewan and Kraemer, 2000:549). In the content of studies evaluating the subject in terms of micro econometric way, ICT's positive contribution to the productivity rise will be found much easily. In that respect, for 1987-1991 era at the end of the investigation held by Brynjolfsson and Hitt over 367 gigantic USA firms covering 5 years time length subject to outcomes ICT expenses were found creating significant gains at corporate productions and productivity (Dursun & Vardareri, 2007). In a comparative analysis executed in Greece and Switzerland on the firms competing in a big size sector was founded statistically significant positive effects for physical capital, ICT capital, human capital and "employee voice"-oriented organizational practices for both samples (Arvanitis and Loukis, 2009: 43). Technology was adopted earlier in USA compare to Europe. In some of the countries adopted technology earlier and established required economic supports and legal organizations ICT created greater gain for productivity growth. ICT's lesser impact over the productivity in European countries compare to USA proves that (Matteucci & O' Mahony & Robinson & Zwick, 2005: 359).

On the other hand, in macro studies Yamak and Kolçak (2007) provided different outcomes subject to developed and developing nations. ICT's impact over economic growth found positive in developed and newly industrialized nations but, in developing nations no support has been created (Lee, Gholami and Tong, 2005: 2009). By means of using plenty of industrial data from USA and England in a study executed by dynamic panel data method, ICT has been found creating significant and positive effect (O' Mahony and Vecchi, 2005:615). In Spain in order to find out the contribution of ICT over economic development positive impact over productivity levels was found (Martinez, et al, 2008: 1596).

ICT is creating direct and indirect effects for labor market. Employment rise in ICT sector and productivity level is usually at higher levels compare to alternative sectors. Demand for labor force possessing skills to use ICT devices is rising up. In an application performed for Spanish firms a positive correlation between the ICT and skill development was found (Bayo-Moriones et al., 2008:122). Searching out ICT's influence on labor productivity for Turkey for the era ranging between 1980-2004 estimating ICT's impact over labor productivity levels Cobb-Douglas applied productivity function. Findings provided that there is no significant statistical correlation between ICT investments per labor productivity and labor (Dursun and Vardareri, 2007:76).

According to Pilat and Lee (2001) ICT's gain over productivity increase is restricted in their own sectors. In plenty of nations globally even productivity made by ICT devices is restrained in infinitesimal magnitude, by means of policies contributing the expansion of those technologies in economics and their efficient use very rapid factor productivity rise is provided all around the nation. Ramlan et. al. (2007) the contribution of ICT to

Malaysian economic growth is the highest at an average of 13 percent for the period 1966 to 2005 against 4.7 percent for Total Factor Productivity (TFP), 9.7 percent for Gross Domestic Product (GDP), 9.6 percent for capital, and 3.0 percent for labor. In a research study completed in five Asian states (Malaysia, Indonesia, Philippine, Singapore and Thailand) (Ahmed, 2007:2254) ICTs has been found providing positive impact over the factor productivity.

3. Methodology

3.1. Purpose of the Research

Purpose of that research is to investigate the performances of Turkey and Bosnia Herzegovina based on ICT variables and to find out the distance of those two states in the course of transforming into information societies. There are three reasons to select those states.

1. Based on the regional countrywide classification of World Bank under KAM concept they are located in Europe and Middle Asia region consisted of 27 states. First conditions of making comparison of different states countries have to be located in the same class according to regional income level and humanitarian development. (<http://go.worldbank.org/CY9PINAVF0>).

2. According to International Telecommunication Union (ITU), IDI (ICT Development Index) points states are divided into four sections (High, Upper, Medium, Low). Turkey and Bosnia Herzegovina are classified in the same group (Upper) (ITU, 2009: 49).

3. Turkey from the year 1995 for reinforcing the economic relations of Bosnia Herzegovina signed up a series of legal laws. At the beginning those laws were "Trade and Economic With Turkey Agreement", "Mutual Reinforcements and Protections of Investments" and "Free Trade Act". (http://www.dtm.gov.tr/dtadmin/upload/ANL/AvrupaDb/Bosna_Hersek.pdf).

3.2. The Model

In the study World bank's "Custom Scorecards" model was applied. Custom Scorecards model is an elastic model enabling the comparison of at least three models. There is no classification to select a variable. Custom Scorecards model compares ICT performances of the nations and use 12 variables. Those variables are stated under another next title (<http://go.worldbank.org/JGA05XE940>).

3.3. Data and Variables

In the present study variables applied in the measurement of ICT performances of nations or regions World Bank variables were used as reference. In ICT calculations 12 indicator were used. But, Bosnia Herzegovina's ICT Expenditure as % of GDP and Daily Newspapers per 1,000 People and Turkey's indicators Daily Newspapers per 1,000 People since there is no data found those indicators were excluded from the investigations. Custom Scorecards model is an elastic model and does not have any restrain in variable selection. Variables going to be applied for two countries are depicted down:

- Telephones Per 1,000 People
- Telephone Mainlines Per 1,000 People
- Mobile Phones Per 1,000 People
- Computers Per 1,000 Persons
- TV Households with Television
- International Internet Bandwidth
- Internet Users Per 1,000 people
- Price Basket for Internet, US\$ per month
- Availability of e-Government Services
- Extent of Business Internet Use

4. Empirical Analysis

Date of Bosnia Herzegovina and Turkey covered in the study for ICT variables are converged into standard form in the equation (1).

$$\text{Normalized (u)} = 10 * (1 - N_h / N_c) \quad (1)$$

The normalization procedure used in the KAM is as follows¹:

1. The actual data (u) is collected from World Bank datasets and international literature for all the variables and countries.
2. Ranks are allocated to countries based on the absolute values (actual data) that describe each and every one of 83 variables (rank u). Countries with the same performance are allocated the same rank. Therefore, the rank equals 1 for a country that performs the best among the countries in our sample on a particular variable (that is, it has the highest score), the rank equals to 2 for a country that performs second best, and so on.
3. The number of countries with higher rank (N_h) is calculated for each country.
4. The following formula is used in order to normalize the scores for every country on every variable according to their ranking and in relation to the total number of countries in the sample (N_c) with available data.
5. The above formula allocates a normalized score from 0 to 10 for each country. 10 is the top score for the top performers and 0 the worst for the laggards.

Variable	Bosnia and Herzegovina (Group: Europe and Central Asia)		Turkey (Group: Europe and Central Asia)	
	actual	normalized	actual	normalized
Total Telephones per 1,000 People, 2006	730.00	3.70	980.00	4.81
Main Telephone Lines per 1000 People, 2006	250.00	4.81	260.00	5.56
Mobile Phones per 1,000 People, 2006	480.00	2.96	720.00	5.19
Computers per 1,000 People, 2005	50.00	3.85	60.00	4.62
Households with Television (%), 2005	87.20	1.54	92.20	4.62
International Internet Bandwidth (bits pp), 2005	39.67	3.60	405.19	6.00
Internet Users per 1000 People, 2006	240.00	5.93	170.00	4.07
Price Basket for Internet (US\$ per month), 2005	7.78	8.52	11.61	5.93
Availability of e-Gov. Services (1-7), 2006	2.78	3.75	3.78	7.92
Extent of Business Internet Use (1-7), 2006	3.80	5.60	3.80	5.60

Table 1: ICT Variable Values of Turkey and Bosnia Herzegovina

As seen from Table 1 according to Custom Scorecards model ICT indicator value of Bosnia Herzegovina is stayed in the range of 1.54 and 8.52 and Turkey's value is stayed between 4.07 and 7.93.

Strongest value of Bosnia Herzegovina is 8.52 value of Price Basket for Internet and lowest value is found as 1.54 of Households with Television. According to those values, Bosnia Herzegovina's Price Basket for Internet exhibits a good value but Households with Television indicator remains very low performance. In terms of the extent of Business Internet Users per 1000 People indicator Bosnia Herzegovina shows a medium level performance and remaining indicators remain at low performance levels.

When Turkey's situation is considered it has satisfactory performance in terms of Availability of e-Government Services, but in terms of Main Telephone Lines per 1000 People, Mobile Phones per 1,000 People, International Internet Bandwidth, Price Basket for Internet and Extent of Business Internet Use usually it remains at medium level performance levels. In terms of Total Telephones per 1,000 People, Computers per 1,000 People, Households with Television and Internet Users per 1000 People Turkey generates a low-medium performance.

When the ICT variable values of Turkey and Bosnia Herzegovina are compared Bosnia Herzegovina's Internet Users per 1000 People and Price Basket for Internet ratios are found higher than Turkey and in terms of remaining rates Turkey has a better position than Bosnia Herzegovina. As a result, ICT variable indicators when investigated by Custom Scorecards Model, Turkey is found creating more efforts than Bosnia Herzegovina in the way of providing a information society.

¹ <http://go.worldbank.org/98RUIWA510>, 02.05.2009.

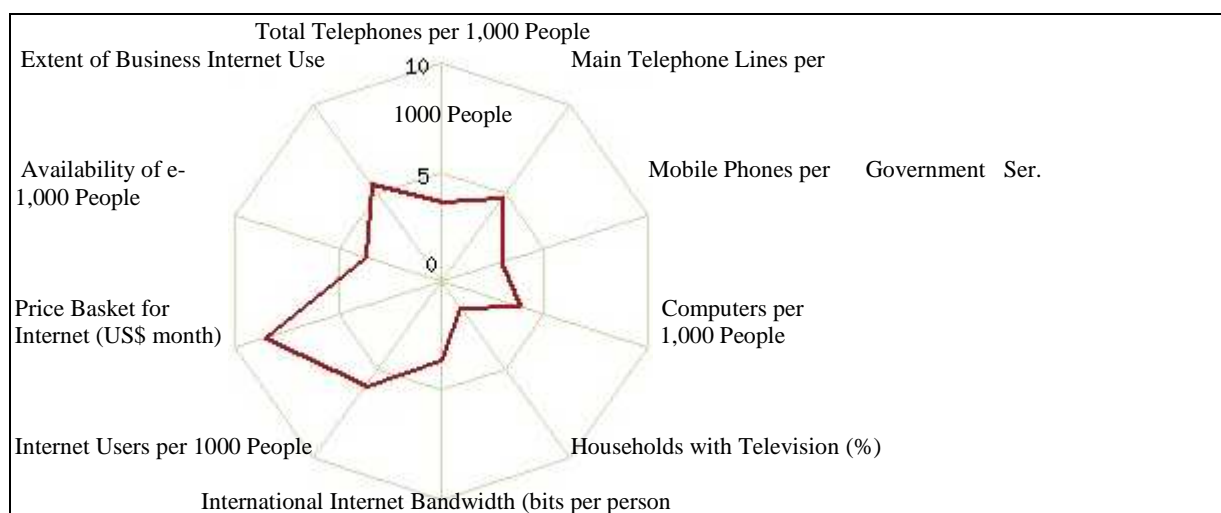


Figure 1: Spider Charts Form of Bosnia Herzegovina's ICT Performance

Investigations performed by Custom Scorecards model may be revealed by interferences of Spider charts. Center of Spider charts converted into standard form indicates to minimum value of 0, its peripheral section indicates to maximum 10. Therefore, if Spider charts are too wide and great that refers to region and country is meant having a good place.

When we look at Figure 1 Spider Chart belonging to Bosnia Herzegovina is found having an irregular and narrow distribution. Except Internet Users per 1000 People and Price Basket for Internet, all other variables are found to be closer to the center of the chart. Especially, Households with Television (%) indicator is very closer to the center of the chart. When evaluated generally, in terms of ICT Bosnia Herzegovina found spending inadequate effort.

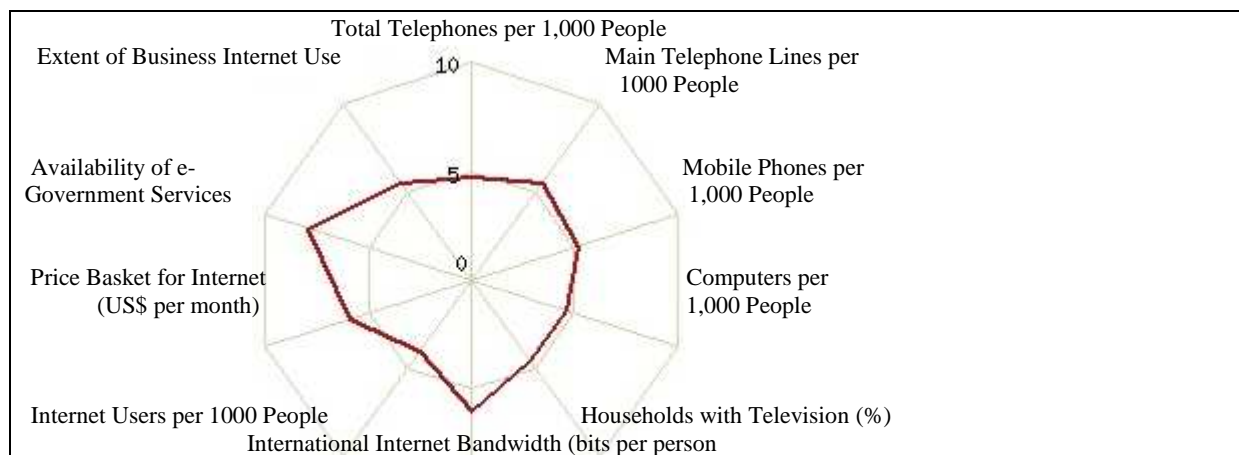


Figure 2: Spider chart of Turkey's ICT Performance

When we look at Figure 2 Turkey's Spider Charts shows a regular and well organized distribution but not in a very wide form. Usually, location of indicator variables on the chart are massed around 5 indicating medium level performance. Location of indicator values of Availability of e-Government Services being closer to the peripheral side of the chart reveals that Turkey is in a good position in that indication. When the chart is investigated as a whole Turkey's ICT performance is found at medium levels.

When two countries are compared all indicators of Turkey excluding Price Basket for Internet (US\$ per month) and Internet Users per 1000 People on the chart are found covering the shape of Bosnia Herzegovina. That circumstance refers to the fact that in Bosnia Herzegovina internet monthly access pocket price is cheaper and as a result users have wider internet connection ratio. Highest variation among the indicators of Turkey and Bosnia Herzegovina is Availability of e-Government Services indicators. That refers that Turkey in e-state services has a much better situation than Bosnia Herzegovina. As a result of investigations completed in overall meaning Turkey's performance is better than Bosnia Herzegovina.

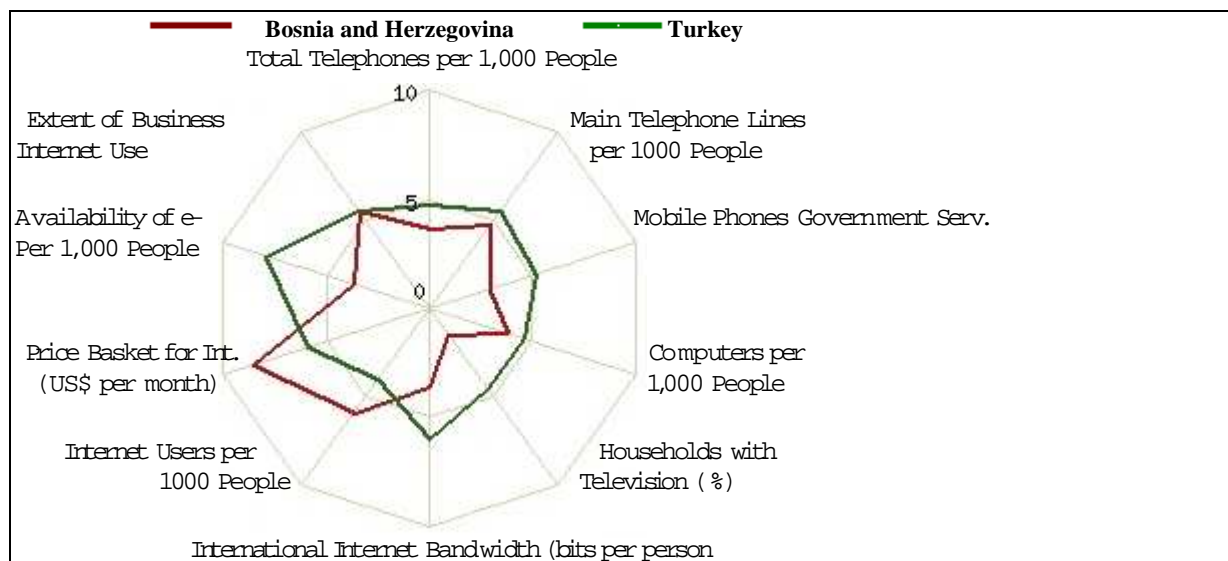


Figure 3: ICT Comparison of Turkey and Bosnia Herzegovina Spider Charts

Conclusions

In that study compiled to investigate the performances of Turkey and Bosnia Herzegovina according to ICT variables Custom Scorecards model is applied and findings have been depicted down.

According to Custom Scorecards model, value of ICT indicators of Bosnia Herzegovina are in the range of 1.54 and 8.52, Turkey's values are in the range of 4.07 and 7.93. Strongest indicator of Bosnia Herzegovina is found as Price Basket for Internet and its lowest ratio is found as Households with Television. When we investigate Turkey's situation strongest indicator is found as Availability of e-Government Services and its weakest indicator is found as Internet Users per 1000 People.

Among the 10 indicator applied in the study in two indicator Bosnia Herzegovina (Price Basket for Internet (US\$ per month and Internet Users per 1000 People) is found more successful with its performance Turkey in 7 indicator (Total Telephones per 1,000 People, Main Telephone Lines per 1000 People, Mobile Phones per 1,000 People, Computers per 1,000 People, Households with Television (%), International Internet Bandwidth and Availability of e-Government Services) found more successful than Bosnia Herzegovina. With regard to Extent of Business Internet Use indicator both countries are in the same success level.

In two indicators Bosnia Herzegovina showed more efficient performance than Turkey. First of them is Price Basket for Internet and the other is Internet Users per 1000 People indicator. From that point, monthly internet connection pocket price is lower in Bosnia Herzegovina and as a result of that, users in Bosnia use internet more frequently.

Highest variation between Turkey and Bosnia Herzegovina is found at Availability of e-Government Services indicator. That refers to the fact that Turkey has much better position than Bosnia Herzegovina in e-state services.

As a result at the end of the investigations held, Turkey in general meaning showed a better performance than Bosnia Herzegovina. But, both countries when evaluated independently their success level is not found satisfactory. Both countries in order to possess their desired location in the sophisticated global environment to promote their economic and social situations to more advanced levels they need to use ICT as a strategic device.

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